

AD-773 550

PROTECTIVE TREATMENTS (INDUSTRIAL PROCESS)

DEFENSE DOCUMENTATION CENTER

FEBRUARY 1974

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<table border="0"> <tr> <td>*Bibliographies</td> <td>Aluminum</td> <td>Steel</td> </tr> <tr> <td>*Diffusion Coatings</td> <td>Aluminum Alloys</td> <td>Stress Corrosion</td> </tr> <tr> <td>*Antifouling Coatings</td> <td>Corrosion Inhibition</td> <td>Corrosion</td> </tr> <tr> <td>*Anodic Coatings</td> <td>Nickel Alloys</td> <td>(See Reverse)</td> </tr> <tr> <td>*Protective Treatments</td> <td>Ship Hulls</td> <td></td> </tr> </table>			*Bibliographies	Aluminum	Steel	*Diffusion Coatings	Aluminum Alloys	Stress Corrosion	*Antifouling Coatings	Corrosion Inhibition	Corrosion	*Anodic Coatings	Nickel Alloys	(See Reverse)	*Protective Treatments	Ship Hulls	
*Bibliographies	Aluminum	Steel															
*Diffusion Coatings	Aluminum Alloys	Stress Corrosion															
*Antifouling Coatings	Corrosion Inhibition	Corrosion															
*Anodic Coatings	Nickel Alloys	(See Reverse)															
*Protective Treatments	Ship Hulls																
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)																	
<p>This unclassified and unlimited bibliography on Protective Treatments (Industrial Process) is grouped under three major headings: Section 1 - Anodic Coatings, Section 2 - Antifouling Coatings, and Section 3 - Diffusion Coatings.</p> <p>Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.</p>																	

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(Item 19, cont'd) KEYWORDS

Titanium Alloys

Wood

Preservation

Metal Coatings

Plastic Coatings

Films

Paints

Barrier Coatings

11
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SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

FOREWORD

This unclassified and unlimited bibliography contains 116 citations of reports on *Protective Treatments (Industrial Process)*. These references were selected from entries processed into the Defense Documentation Center's data bank during the period of January 1953 to August 1973.

This bibliography supersedes *Protective Treatments*, AD-722 800, DDC-TAS-70-84-I, dated March 1971.

This report is topically arranged in alphabetical order into the following subtopics:

Section I Anodic Coatings

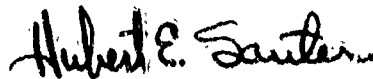
Section II Antifouling Coatings

Section III Diffusion Coatings

Entries are sequenced by AD number in each section. Computer generated indexes of Corporate Author-Monitoring Agency, Subject, Title, and Personal Author are included.

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OFFICIAL



HUBERT E. SAUTER
Administrator
Defense Documentation Center

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SUBJECT.....	D-1
TITLE.....	T-1
PERSONAL AUTHOR.....	P-1

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I

ANODIC COATINGS

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-263 995

FRANKFORD ARSENAL PHILADELPHIA PA

CORROSION RESISTANCE OF ANODIC COATINGS FOR ALUMINUM
ALLOYS (U)

FEB 61 IV SIGISMUND, MARKI
REPT. NO. T61 12 1

UNCLASSIFIED REPORT

DESCRIPTORS: *ALUMINUM ALLOYS, *COATINGS, *CORROSION
INHIBITION, ALUMINUM COMPOUNDS, ANODES (ELECTROLYTIC
CELL), CHEMICAL REACTIONS, CHLORIDES, CHROMATES, CHROMIC
ACIDS, CORROSION, CORROSIVE GASES, MILITARY
REQUIREMENTS, OXIDES, SALTS, SOLUTIONS, SULFATES,
SULFURIC ACID, TEST METHODS, TESTS, VAPORS (U)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-439 085

NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL
MATERIALS LAB

EVALUATION OF FINE, ANODIZED BERYLLIUM WIRE. (U)

MAY 64 2P

REPT. NO. NAEC-AML-1943

UNCLASSIFIED REPORT

DESCRIPTORS: (•BERYLLIUM, MECHANICAL PROPERTIES),
(•WIRE, BERYLLIUM), COATINGS, ANODES (ELECTROLYTIC
CELLS), TENSILE PROPERTIES, DEGRADATION, OXIDATION. (U)
IDENTIFIERS: ANODIC COATINGS (U)

TENSILE DATA ON FINE, ANODIZED BERYLLIUM WIRE ARE
PRESENTED. TENSILE STRENGTH OF THE AS-DRAWN WIRE
WAS REPORTED AT ABOUT 179,000 PSI AND ELONGATION FELL
IN THE RANGE 1.0 TO 2.1%. THE TENSILE STRENGTH OF
THE WIRE DEFINITELY SHOWS A SIGNIFICANT LOSS WHEN
COMPARED WITH THE VALUE REPORTED FOR AS-DRAWN
MATERIAL. IT IS DIFFICULT NOT TO ATTRIBUTE THIS
LOSS TO THE ANODIZING TREATMENT OR POSSIBLY TO SOME
INTERMEDIATE CHEMICAL TREATMENT USED IN THE ANODIZING
PROCESS. DAMAGE CONCEIVABLY COULD COME FROM STRESS
CORROSION AND/OR PITTING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-465 429

TYCO LABS INC WALTHAM MASS

AGEING EFFECTS IN THIN ANODIC OXIDE FILMS ON AU IN
HClO₄.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMORANDUM;

JUN 65 10P BRUMMER, S. B. ;

REPT. NO. TM-20

CONTRACT: NONR376500

PROJ: 9800, ARPA ORDER 302-62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GOLD, ELECTRODES), (*FILMS,
OXIDES), (*ELECTRODES, OXIDATION),
ELECTROCHEMISTRY, PERCHLORIC ACID, VOLTAGE,
REDUCTION(CHEMISTRY), REACTION KINETICS,
AGING(MATERIALS), COATINGS, ANODES
IDENTIFIERS: ANODIC COATING

(U)

(U)

THE PROPERTIES OF ANODIC OXIDE FILMS ON AU IN
LN HClO₄ WERE STUDIES AS A FUNCTION OF TIME
(2 SEC TO 5 MIN) AND OF POTENTIAL OF FORMATION
(1450 TO 1850 MV VS. PT, H₂/H⁺ IN THE SAME
SOLUTION). OVER THE RANGE OBSERVED (10-20%
OF THE TOTAL OXIDE), THE OXIDE GROWS SLOWLY WITH
TIME, APPARENTLY ACCORDING TO ELOVICH KINETICS,
ALTHOUGH THE CONSTANTS ARE POTENTIAL-DEPENDENT.
OXIDES FORMED AT LONGER TIMES AT A GIVEN POTENTIAL
ARE HARDER TO REDUCE. THIS AGING EFFECT IS
GREATEST AT THE LOWER POTENTIALS OF FORMATION,
DESPITE THE GREATER THICKNESS OF THE OXIDE AT THE
HIGHER POTENTIALS AND DESPITE THE LARGER CHANGE IN
THE AMOUNT OF OXIDE AT THE HIGHER POTENTIALS.
BECAUSE OF THESE AGING EFFECTS, THE TRIANGULAR
SWEEP METHOD OF WILL AND KNORR IS NOT SUITABLE TO
STUDY THESE FILMS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-469 954

BRITISH NON-FERROUS METALS RESEARCH ASSOCIATION LONDON
(ENGLAND)

SURFACE TREATMENT OF TITANIUM ALLOYS: A REVIEW OF
PUBLISHED INFORMATION, (U)

DESCRIPTIVE NOTE: RESEARCH REPT.,

MAY 65 17P FINCH, N. J. ; BOWERS, J. E. ;
REPT. NO. A-1536MAL/E
MONITOR: MA S/T-MEMO-9/65

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TITANIUM ALLOYS, SURFACES),
(*SURFACES, PROTECTIVE TREATMENTS), WEAR
RESISTANCE, OPTIMIZATION, LUBRICANTS, FRICTION,
REVIEWS, PLATING, CHROMIUM, ADHESION, NICKEL,
COATING, SPRAYS, METALS, NICKEL ALLOYS, IRON
ALLOYS, COBALT ALLOYS, MOLYBDENUM, PLASMA JETS,
REFRACTORY MATERIALS, VAPOR PLATING, PLASTIC
COATINGS, SURFACE PROPERTIES (U)

IDENTIFIERS: ANODIC COATINGS, CHEMICAL CONVERSION
COATINGS (U)

THIS REPORT REVIEWS THE USE OF LUBRICANTS AND
SURFACE COATINGS TO IMPROVE THE WEAR AND GALLING
RESISTANCE OF TITANIUM ALLOYS. THE METHODS OF
COATING DISCUSSED ARE ANODIC OXIDATION, PLATING,
METAL SPRAYING, DEPOSITION FROM A VAPOUR PHASE,
DIFFUSION TREATMENTS WITH GASES AND IN ACTIVE SALT
BATHS, METALLIC DIFFUSION COATINGS, SURFACE HARDENING
BY HEAT TREATMENT, CHEMICAL CONVERSION COATINGS AND
PLASTIC COATINGS. IT IS CONCLUDED THAT THE MOST
IMPORTANT CRITERIA FOR A COATING FOR HIGHLY STRESSED
COMPONENTS WITH HEAVY SURFACE LOADS ARE: (1)
WEAR AND GALLING RESISTANCE MUST BE GOOD; (2)
STRONG ADHESION BETWEEN COATING AND SUBSTRATE MUST BE
ACHIEVED; (3) THE COATING MUST WITHSTAND HIGH
LOADS AND SLIDING FORCES, AND (4) MECHANICAL
PROPERTIES OF THE UNDERLYING TITANIUM ALLOY SHOULD
NOT BE IMPAIRED BY THE COATING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-476 464 7/4 11/3
HOLMAN (JOHN F) CO INC WASHINGTON D C

THE STRUCTURE OF THIN ANODIC FILMS ON ALUMINUM
SURFACES,

(U)

JAN 66 22P GINSBERG, H. IWEFERS, K. J
CONTRACT: DA-44-009-AMC-930(T)
PROJ: DA-44-C-024401-A-328
MONITOR: AERDL T-1813-65

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. FROM ZUR STRUKTUR DER
ANODISCHEN DECKSCHICHTEN AUF ALUMINIUMOBERFLACHEN, METALL,
17:3, MAR 63

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS),
(*ANODIC COATINGS, MICROSTRUCTURE), FILMS,
ELECTRODEPOSITION, SURFACES, SULFURIC ACID,
ELECTRON MICROSCOPY, X-RAY DIFFRACTION ANALYSIS,
INFRARED SPECTROSCOPY, REFRACTIVE INDEX,
DIFFERENTIAL THERMAL ANALYSIS, CRYSTALS, FIBERS,
ALUMINUM COMPOUNDS, HYDROXIDES, OXIDES,
CARBOXYLIC ACIDS, OXALIC ACIDS, FOILS
IDENTIFIERS: ELOXAL FILMS

(U)

(U)

FROM THE RESULTS OF PHYSICAL MEASUREMENTS AND
MORPHOLOGICAL INVESTIGATIONS THE STRUCTURE OF THE
ELOXAL FILMS IS DESCRIBED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-612 774

AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

EFFECTS OF VACUUM-ULTRAVIOLET ENVIRONMENT OF THE
OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 JAN 63-1 AUG 64,

JAN 65 23P WEAVER, JAMES H. I

REPT. NO. TR-64-355

PROJ: 7340

TASK: 734007

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SPACE ENVIRONMENTAL CONDITIONS,
ALUMINUM), (*ALUMINUM, COATINGS), (*COATINGS, ALUMINUM),
(*PROTECTIVE TREATMENTS, ALUMINUM), OPTICAL PROPERTIES,
TEMPERATURE CONTROL, ENVIRONMENTAL TESTS, ULTRAVIOLET
RADIATION, LOW PRESSURE RESEARCH, DEGRADATION, THERMAL
RADIATION, VACUUM, COLOR CENTERS, ABSORPTION, ALUMINUM
COMPOUNDS, OXIDES (U)
IDENTIFIERS: ANODIC COATINGS (U)

THE RAPID INCREASE IN SPACE VEHICLE DESIGN
RELIABILITY AND LIFETIME REQUIREMENTS HAS CREATED A
SERIOUS PROBLEM IN THE SELECTION OF MATERIALS FOR
PASSIVE TEMPERATURE CONTROL. THE MAJOR DIFFICULTY
IS THE PREDICTION OF THE DEGRADATION OF THE THERMAL
RADIATION PROPERTIES OF THESE MATERIALS UNDER THE
SPACE ENVIRONMENT. BRIGHT ANODIZED ALUMINUM
COATINGS ARE KNOWN TO POSSESS THE DESIRED OPTICAL
PROPERTIES FOR PASSIVE TEMPERATURE CONTROL AND ARE
BEING CONSIDERED FOR SPACE VEHICLE APPLICATION.
THE EFFECTS OF THE VACUUM-ULTRAVIOLET ENVIRONMENT
ON THE OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM
HAVE BEEN DETERMINED. THE OPTICAL PROPERTIES OF
THE BRIGHT ANODIZED ALUMINUM SYSTEM ARE ONLY SLIGHTLY
ALTERED BY ULTRAVIOLET RADIATION IN AIR. HOWEVER,
THE COMBINED VACUUM-ULTRAVIOLET RADIATION IS THE MOST
DETRIMENTAL TO THE REFLECTANCE OF BRIGHT ANODIZED
COATINGS PREPARED BY THE SULFURIC ACID PROCESS.
THE COLOR CENTERS FORMED DURING EXPOSURE CAUSES A
GRADUAL INCREASE IN ABSORPTION UP TO 120 HOURS
EXPOSURE. THIS INCREASE IN SOLAR ABSORPTION CAUSES
THE ALPHA SUB S/EPSILON RATION TO INCREASE TO 0.42
AFTER APPROXIMATELY 120 HOURS EXPOSURE, BUT AFTER
THIS CHANGE, VERY LITTLE FURTHER CHANGE IS NOTED,
UNLIKE MOST ORGANIC AND INORGANIC COATINGS.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-624 993 11/3
SPRINGFIELD ARMORY MASS

DEVELOPMENT OF A FIXTURE AND A PROCEDURE FOR HARD-
ANODIZING THE SURFACES OF A LONG ALUMINUM TUBE WITH A
DEEP BLIND-HOLE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 65 22P SPIVAK, H. S. I
REPT. NO. SA-TR18-109E
PROJ: AF-D7-3-20037-01-D7-M6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ANODIC
COATINGS, ALUMINUM), (*PIPES, ANODIC COATINGS),
POSITIONING DEVICES(MACHINERY), PROCESSING (U)

A RACK WAS DESIGNED AND A METHOD DEVELOPED FOR THE
HARD-ANODIZING OF EXTERIOR AND INTERIOR DIAMETERS OF
A LONG TUBE. THE DEVELOPMENT OF THE PROCEDURE WAS
COMPLICATED BY THE NECESSITY OF HARD-ANODIZING THE
INTERIOR DIAMETER OF AN EXTREMELY DEEP BLIND-HOLE.
THE DESIGN OF THE FIXTURE IS DISCUSSED AND THE
METHOD IS OUTLINED. (AUTHOR) (U)

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ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-630 688 13/8 11/6
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

HARD ANODIZING OF BAKED ALUMINUM POWDER, (U)

66 9P ZAREZKI, E. M. IPAVLOVSKAYA, T.

G. I

CONTRACT: DA-44-009-AMC-1563(T),

PROJ: DA-1C024401A328,

MONITOR: AERDL TT T-1823-66 ,66-60912

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TVERDOE ANODIROVANIE SPECHENOGO
ALUMINIEVOGO POROSHKA, TRANS. OF VESTNIK
MASHINOSTROENIYA (USSR) N11 1963.

DESCRIPTORS: (*ALUMINUM, POWDER METALS), (*POWDER
METALS, ELECTROPLATING), (*ANODIC COATINGS,
ALUMINUM ALLOYS), USSR, HARDNESS

(U)

IDENTIFIERS: ANODIZE

(U)

TRANSLATION OF RUSSIAN RESEARCH: HARD ANODIZING OF
BAKED ALUMINUM POWDER.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-631 171 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

OPTICAL STUDIES ON ANODIC OXIDE FILMS ON ALUMINIUM
(1/11).

(U)

APR 66 31P SAKAE,TAJIMA ;
CONTRACT: DA-44-009-AMC-1E63(T),
PROJ: DA-1C024401A328
MONITOR: AERDL ,TT T-1824-66 .66-61029

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF KEIKINZOKU (JAPAN) V14
N4(66) 1964.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS); (*ANODIC
COATINGS, ALUMINUM), OXIDATION, OXIDES, OPTICAL
PROPERTIES, SULFATES, ALUMINUM COMPOUNDS, OXIDES,
JAPAN, ALUMINUM ALLOYS, TITANIUM ALLOYS,
REFRACTIVE INDEX, FILMS

(U)

IDENTIFIERS: ALUMINUM OXIDES

(U)

OPTICAL ANALYSIS OF THE MECHANISM OF FORMATION OF
ALPHA-ALUMINA FILM: MAIN CONSTITUENTS OF THE
FILMS PRODUCED IN SODIUM AND POTASSIUM BISULPHATE
MELTS OR THEIR MIXTURES WERE CONFIRMED TO BE ALPHA-
AL₂O₃. THE FILM FORMED IN AMMONIUM BISULPHATE
MELT CONTAINED AN APPRECIABLE AMOUNT OF GAMMA-
ALUMINA. THE FILMS FORMED IN CONC. H₂SO₄ OR
IN CONC. H₂SO₄+OLEUM, CONSIST MAINLY OF GAMMA-
AL₂O₃, BUT BY LONGER FORMATION, IT WAS PARTLY
CONVERTED TO ALPHA-AL₂O₃. REFRACTIVE INDICES
AND DOUBLE REFRACTION OF VARIOUS ANODIC OXIDE FILMS:
ANODIC OXIDE FILMS SUCH AS OXALIC, SULPHURIC ACID
FILMS FORMED AT NORMAL ANODIZING CONDITIONS AND AT
LOWER TEMPERATURE (HARD-COATING), CHROMIC,
SULPHAMIC, PHOSPHORIC, BORIC (PLUS SULPHURIC)
ACID FILMS, EMATAL AND KALCOLOR FILMS AND BORIC
ACID-FORMAMIDE FILMS DEVELOPED BY THE AUTHORS, WERE
OBSERVED UNDER POLARIZING MICROSCOPY AND THE
REFRACTIVE INDICES WERE DETERMINED AND THE EXISTENCE
OF DOUBLY-REFRACTING PROPERTIES WAS CHECKED.
REFRACTIVE INDICES OF THESE FILMS ARE USUALLY LOWER
THAN PURE CRYSTALLINE OR AMORPHOUS ALUMINA (1.67
PLUS OR MINUS). (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-631 174 13/8 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ORIGINAL FOUNDRY ALUMINUM 'AL 99.9H' AS NEWER GLAZING
MATERIAL, (U)

APR 66 12P GINSBERG, H. PLATTEY, R. I
NEUNZIG, H. I
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024-401A328,
MONITOR: AERDL ,TT T-1837-66 ,66-61032

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ORIGINAL-HUTTEN-ALUMINIUM 'AL
99.9H' ALS NEUER GLANZWERKSTOFF, TRANS. OF DAS
METALL (WEST GERMANY) N3 P183-6 1960.

DESCRIPTORS: (ALUMINUM, ANODIC COATINGS),
(ALUMINUM ALLOYS, COATINGS), MAGNESIUM ALLOYS,
SILICON ALLOYS, IRON ALLOYS, WEST GERMANY (U)

METHODS ARE DESCRIBED WHEREBY ALUMINUM AND ITS
ALLOYS ARE GIVEN A GLAZE BY THE ELOXAL OR
ALUMILITE ANODIC PROTECTION TREATMENTS. THE
TREATMENTS IMPART SMOOTHNESS AND GLAZE AND A HARD,
THICK AND TRANSPARENT OXIDE LAYER. GLAZING
PROCESSES CURRENTLY IN USE ARE: THE ERFT
PROCESS, BASED ON A NITRIC ACID-AMMONIUM HYDROGEN
FLUORIDE SOLUTION; THE ALLUPOL II (R5 BRIGHT
DIP) PROCESS, BASED ON PHOSPHORIC AND NITRIC ACIDS;
THE ALUFLEX PROCESS, BASED ON SULFURIC AND CHROMIC
ACIDS; AND THE BRYTAL PROCESS, BASED ON A
TRISODIUM AND SODA SOLUTION. RELATIONSHIPS WERE
DETERMINED BETWEEN GLAZE AND GLAZING PROCESS IN
ELOXAL-TREATED ORIGINAL-FOUNDRY QUALITY ALLOY
ERFTAL AND THE ALLOYS WITH MAGNESIUM, THE
RAFFINALS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-632 835 11/3 13/8
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA
PA

PROTECTION OF BERYLLIUM AGAINST HIGH TEMPERATURE
OXIDATION. (U)

DESCRIPTIVE NOTE: TECHNICAL RESEARCH ARTICLE,
JAN 66 8P PEARLSTEIN, FRED INICK, REYBURN
W. GALLACCIO, ANTHONY J
PROJ: DA-1C024401A328.
MONITOR: FA J A66-6

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN METAL FINISHING JAN
1966.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•BERYLLIUM, •ANODIC COATINGS),
CHROMATES, OXIDATION, HIGH-TEMPERATURE RESEARCH,
CHROMIC ACIDS (U)

THE INFLUENCE OF CHEMICAL CHROMATE FILM ON THE HIGH
TEMPERATURE OXIDATION BEHAVIOR OF BERYLLIUM WAS
INVESTIGATED. CHROMATE CONVERSION COATINGS WERE
APPLIED TO BERYLLIUM FROM SOLUTION NORMALLY UTILIZED
FOR ALUMINUM. CHROMATED BERYLLIUM WAS UNOXIDIZED
AFTER 24 HOURS' EXPOSURE TO MOIST AIR AT 900° C.
UNTREATED BERYLLIUM WAS CATASTROPHICALLY OXIDIZED
UNDER THE SAME CONDITIONS. (AUTHOR) (U)

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AD-633 986 11/6 11/2 11/3
WATERVLIET ARSENAL N Y BENET LABS

PROCESS FOR ANODIZING TITANIUM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 66 44P POCHILY, THEODORE M. I
PROJ: DA-66267,
MONITOR: WVT , 6605

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TITANIUM, *ANODIC COATINGS),
BEARINGS, WEAR RESISTANCE, MECHANICAL PROPERTIES,
ELECTROLYSIS, ELECTROLESS PLATING

(U)

THE REQUIREMENTS OF AN ADVANCING TECHNOLOGY IN
WEAPONRY, AIRCRAFT, AND AEROSPACE HAVE NECESSITATED A
CONSIDERATION OF LIGHT METALS AS A SUBSTITUTE FOR
STEEL. IN THE SEARCH TO REDUCE WEIGHT, AND
CONSEQUENTLY INCREASE MOBILITY, TITANIUM OFFERS
VALUABLE ASSISTANCE. THE USE OF TITANIUM AS AN
ENGINEERING AND STRUCTURAL MATERIAL HAS BEEN ACCEPTED
FOR A COMPARATIVELY SHORT TIME. THIS ACCEPTANCE
WAS PREDICATED ON TWO IMPORTANT FACTORS, STRENGTH/
WEIGHT RATIO AND CORROSION RESISTANCE. THE TENDENCY
OF TITANIUM TO GALL AND SEIZE, WHEN USED AS A BEARING
OR MATING SURFACE, HAS RESTRICTED A FULL UTILIZATION
OF THE METAL. WORK CONDUCTED AT WATERVLIET
ARSENAL TO DEVELOP A PROCESS THAT REDUCES OR
ELIMINATES THIS CONDITION WAS EVALUATED.
PROCESSING DETAILS, A SUMMARY OF TEST DATA COVERING
WEAR RESISTANCE, AND THE EFFECTS OF THE PROCESS ON
THE MECHANICAL PROPERTIES OF TITANIUM ARE DISCUSSED.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 408 11/3
NORTHERN ELECTRIC CO LTD OTTAWA (ONTARIO)

IONIC CONDUCTIVITY, DIELECTRIC CONSTANT, AND OPTICAL
PROPERTIES OF ANODIC OXIDE FILMS ON TWO TYPES OF
SPUTTERED TANTALUM FILMS. (U)

DESCRIPTIVE NOTE: REVISED ED.

DEC 65 4P MILLS, D. IYOUNG, L. IZOBEL, F.
G. R. I

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED
PHYSICS V37 N4 P1821-4 15 MAR 1966. PREPARED IN
COOPERATION WITH BRITISH COLUMBIA UNIV. VANCOUVER.

ELECTRICAL ENGINEERING LABS.

SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 18
OCT 1965.

DESCRIPTORS: (ANODIC COATINGS, FILMS), (TANTALUM,
FILMS), OXIDES, IONIC CURRENT, ELECTRICAL
CONDUCTANCE, DIELECTRIC PROPERTIES, OPTICAL
PROPERTIES, SPUTTERING, METAL FILMS, SURFACE
PROPERTIES, SUBSTRATES (U)

THE GROWTH OF ANODIC OXIDE FILMS ON SPUTTERED
TANTALUM FILMS IN DILUTE SULFURIC ACID HAS BEEN
STUDIED BY IN SITU ELLIPSOMETRY. TWO TYPES OF
TANTALUM FILM WERE USED WHICH HAD BEEN DEPOSITED ONTO
SUBSTRATES AT DIFFERENT TEMPERATURES GIVING TWO
STRUCTURAL FORMS OF TANTALUM ('BETA' AND BCC).
THE OPTICAL PROPERTIES OF THE METAL FILMS DIFFERED
FROM EACH OTHER AND FROM THOSE OF THE BULK METAL BUT
THE REFRACTIVE INDEX AND DIELECTRIC CONSTANT OF THE
OXIDES WERE NEVERTHELESS VERY SIMILAR TO THOSE FOR
THE OXIDE ON BULK TANTALUM. HOWEVER, THE FIELD E
IN THE OXIDE REQUIRED TO PRODUCE A GIVEN IONIC
CURRENT DENSITY I WAS ABOUT 4% HIGHER THAN FOR
THE OXIDE ON THE BULK METAL AND $\Delta \log I / \Delta E$
WAS SLIGHTLY LESS THAN FOR THE BULK METAL. THIS
APPEARS TO SHOW AN EFFECT OF THE METAL/OXIDE
INTERFACE AS PREDICTED BY MOTT AND CABRERA.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 647

11/3

11/6

13/8

INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ON ANODIC OXIDATION OF ALUMINUM IN CHROMIC ACID. (U)

JUN 66 35P MODIC, F. I
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL,TT T-1854-66 ,66-61781

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NEUERE ERFAHRUNGEN AUF DEM GEBIETE
DER ANODISCHEN OXYDATION VON ALUMINUM IN CHROMSAURE,
TRANS. OF ALUMINUM (WEST GERMANY) V39 P169-80 1963.

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM),
OXIDATION, CHROMIC ACIDS, DIRECT CURRENT,
PROCESSING, WEST GERMANY (U)

PARTICULAR ATTENTION WAS HERE GIVEN TO WORKING WITH
BATH TEMPERATURES ABOVE 45 DEGREES C. OXIDE FILMS
ARE HERE FORMED MUCH QUICKER THAN WITH THE EARLIER
LOW BATH TEMPERATURES AND ARE CHARACTERIZED BY AN
ATTRACTIVE AND COMPLETELY OPAQUE APPEARANCE. THEY
CAN ALSO BE DYED RELATIVELY QUICKLY IN SATURATED
TINTS. THEY THUS BECOME HIGHLY SUITABLE FOR
DECORATIVE PURPOSES WHICH WAS NOT THE CASE IN THE
PAST. THE REPORT ALSO DISCUSSES IN DETAIL THE
INFLUENCE OF IMPURITY ANIONS IN THE CHROMIC ACID BATH
AND SPECIFICALLY THE EFFECT OF SULFATE IONS ON THE
OPAQUENESS OF THE ANODIZED ITEMS. IT FURTHER MAKES
SUGGESTIONS ON THE CONTROL OF THE BATH AND/OR
POSSIBILITIES OF REGENERATION IN THE CHROMIC ACID
PROCESS AND GIVES SOME INDICATIONS IN REGARD TO COST
CALCULATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 648 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ON THE FORMATION OF NOT COMPLETELY WEAR-RESISTANT
COATINGS ON THE ANODIC OXIDE FILM WHEN ADDING CERTAIN
DYES TO THE SEALING BATH. (U)

JUN 66 15P MODIC. F. 1
CONTRACT: DA-44-069-AMC-1563(T),
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL,TT T-1855-66 66-61782

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UEBER DIE BILDUNG NICHT
ABRIEBFESTER AUFLAGEN AUF DER ANODISCHEN OXYDSCHICHT
BEIM ZUSATZ GEWISSE FARBSTOFFE ZUM SEALBAD,
TRANS. OF ALUMINUM (WEST GERMANY) V.36 P457-63 1960.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ANODIC
COATINGS, *DYES), WEAR RESISTANCE, OXIDES,
FILMS, SEALING COMPOUNDS, COMPLEX COMPOUNDS,
MOLECULAR PROPERTIES, SOLUBILITY, SALICYLIC ACIDS,
WEST GERMANY (U)

THE REPORT DISCUSSES THE PHENOMENON OF SEAL-ACTION
OF CERTAIN DYESTUFFS ADDED IN SMALL AMOUNTS TO THE
SEALING BATH. IT WAS CONFIRMED THAT THE SEAL-ACTION
CAN BE RELATED IN ALL DYESTUFFS CONCERNED TO THEIR
MOLECULAR CONSTITUTION. FOR THEIR RESPECTIVE
BEHAVIOR ARE RESPONSIBLE CERTAIN SPECIFIC CHELATE-
FORMING GROUPINGS IN THE DYESTUFF MOLECULE.
CORRESPONDING TO THESE GROUPINGS, ALL SEAL-ACTIVE
DYESTUFF WERE SUBDIVIDED INTO FOUR CLASSES.
DYESTUFFS WITH THESE GROUPINGS ARE CAPABLE OF
ENTERING INTO A METALLIC COMPLEX DURING THE SEALING
PROCESS WITH THE NOT WEAR-RESISTANT COATING FORMED ON
THE SURFACE OF THE ANODIC FILM. IT IS MOST
PROBABLE THAT THE ALUMINUM-COMPLEX DYESTUFF THUS
FORMED BECOMES WATER-SOLUBLE. THIS IS THE REASON
WHY THIS PROCESS PRODUCES AFTER SEALING ALWAYS A
SHINY AND WEAR-RESISTANT ANODIC OXIDE FILM WHERE THE
SURFACE OF THE LATTER IS COMPLETELY FREE OF NOT WEAR-
RESISTANT REACTION PRODUCTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 649 13/8 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

RECENT DEVELOPMENTS IN THE FIELD OF HIGH-GLOSS
ALUMINUM.

(U)

JUL 66 17P TRAGNER, E. KAPPEL, G. ;
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024401-A328,
MONITOR: TT AERDL 66-61783 ,T-1852-66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NEUERE ENTWICKLUNG AUF DEM GEBIET
DER ALUMINUM-GLANZWERK-STOFFE. TRANS. OF ALUMINUM
(WEST GERMANY) V36 N5 P267-71 MAY 1960.

DESCRIPTORS: (ALUMINUM, BRIGHTNESS), (ANODIC
COATINGS, ALUMINUM), WEST GERMANY, ALUMINUM
ALLOYS, MAGNESIUM ALLOYS, PRECISION FINISHING,
REFLECTION, FOILS, SURFACE PROPERTIES

(U)

THE REFLECTAL MATERIALS FOR BRIGHT ANODIZING, MADE
FROM 99.99% AL, HAVE GIVEN EXCELLENT RESULTS IN THE
MOST DIVERSE APPLICATIONS WITH RESPECT TO GLOSS AND
REFLECTANCE. IN RECENT TIMES, HOWEVER, ATTEMPTS ARE
BEING MADE FOR ECONOMIC REASONS, TO REPLACE THESE
HIGH-PURITY ALLOYS BY LESS PURE AND THUS CHEAPER
MATERIALS, E.G., ON BASIS OF AL 99.9 (REMIRAL)
OR EVEN 99.8/99.85. THE IMPROVEMENT OF THE BRIGHT
ANODIZING METHODS AND THE MANY YEARS OF EXPERIENCE
GAINED BY THE PROCESSORS OF THESE MATERIALS HAVE MADE
SUCH A REPLACEMENT FEASIBLE. IT MUST BE
REMEMBERED, HOWEVER, THAT AN INCREASE IN THE IMPURITY
LEVEL MAKES THE ACHIEVEMENT OF HIGH, UNIFORM GLOSS
MORE DIFFICULT, PARTICULARLY UNDER ACTUAL PRODUCTION
CONDITIONS, SO THAT COMPROMISES WITH REGARD TO THE
BRIGHTNESS CHARACTERISTICS, PARTICULARLY FOR LARGE,
PLANE SURFACES, MUST BE ACCEPTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 667 7/4 11/6 11/3
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL
ENGINEERING

AN ELLIPSO-METRIC STUDY OF STEADY-STATE HIGH FIELD
IONIC CONDUCTION IN ANODIC OXIDE FILMS ON TANTALUM,
NIOBIUM, AND SILICON. (U)

DESCRIPTIVE NOTE: REVISED ED.
NOV. 65 3P YOUNG, L. IZOBEL, F. G. R. J

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF THE
ELECTROCHEMICAL SOCIETY V113 N3 P277-84 MAR 1966.

SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 2
AUG 65.

DESCRIPTORS: (*ANODIC COATINGS, IONIC CURRENT),
(*TANTALUM, ANODIC COATINGS), (*NIOBIUM, ANODIC
COATINGS), (*SILICON, ANODIC COATINGS), HEAT OF
ACTIVATION, THEORY, ELECTRIC FIELDS, CANADA (U)

THE CLASSICAL THEORY OF IONIC CONDUCTION IN SOLIDS
AT HIGH FIELD STRENGTHS (1,000,000 TO 10,000,000
PREDICTS THAT THE RELATION BETWEEN THE IONIC CURRENT
DENSITY i AND THE FIELD STRENGTH E SHOULD BE $i =$
 $i_0 \exp (-W(E)/KT)$ WHERE THE ACTIVATION
ENERGY $W(E) = W_0 - qAE$, q IS THE MAGNITUDE OF
THE CHARGE ON THE IONS, A IS HALF THE DISTANCE
BETWEEN SUCCESSIVE SITES OCCUPIED BY THE IONS, AND
 i_0 IS A CONSTANT. DEVIATIONS FROM THIS SUPPOSED
LAW HAVE BEEN REPORTED IN VARIOUS FORMS. NEW
EXPERIMENTAL RESULTS FOR STEADY-STATE CONDITIONS ARE
REPORTED WHICH WERE OBTAINED BY IN SITU ELLIPSO-METRY.
THESE CONFIRM FOR TANTALUM AND ESTABLISH FOR THE
FIRST TIME FOR NIOBIUM THAT THE DEVIATIONS MAY BE
SIMPLY AND ACCURATELY DESCRIBED BY TAKING THE
ACTIVATION ENERGY TO BE NONLINEAR IN E IN A WAY
WHICH MAY BE REPRESENTED OVER THE EXPERIMENTAL RANGE
OF E BY $W_0 - q(\alpha + \beta E)$. DATA WERE
ALSO OBTAINED FOR SILICON, BUT WERE NOT SUFFICIENTLY
ACCURATE TO DETECT NONLINEARITY. MODELS ARE
DISCUSSED WHICH MIGHT GIVE THIS EFFECT. A MODEL IN
WHICH IONS MOVE FAIRLY FREELY IN CHANNELS WITH
INFREQUENT TRAPPING BY A COULOMBIC POTENTIAL LEADS TO
A LAW OF THE FORM $i = i_0 \exp (-W_0 - \gamma \sqrt{E})/KT$,
(SQ ROOT OF E)/KT, ANALOGOUS TO THE SCHOTTKY
AND POOLE-FRENKEL LAWS FOR ELECTRONIC CURRENTS.
SUCH A LAW FITS THE DATA WELL ENOUGH FOR THE MODEL
TO BE CONSIDERED AS REALISTIC (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 687 11/3 11/6
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ON THE FORMATION OF OXIDE FILMS ON ALUMINUM. (U)

JUN 66 31P KADEN, W. T
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024401A328,
MONITOR: TT AERDL 66-61785 ,T-1649-66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: BEITRAG ZU DEN WACHSTUMSVORGANGEN
VON OXIDSCHICHT-EN AUF ALUMINUM, TRANS. OF ALUMINUM,
(WEST GERMANY) V39 P33-41 1963.

DESCRIPTORS: (ANODIC COATINGS, ALUMINUM), (FILMS,
OXIDES), (ALUMINUM, OXIDATION), WEST GERMANY,
MEASUREMENT, THICKNESS, PREPARATION (U)

ALUMINUM SPECIMENS PROVIDED WITH DIFFERENT TYPES OF
OXIDE FILMS WERE INVESTIGATED FOR THE PURPOSE OF
OBTAINING A NEW INSIGHT INTO THE MECHANISM OF
DEVELOPMENT OF THE OXIDE FILMS. IT WAS DESIRABLE
HERE TO CARRY OUT THE MEASUREMENTS ON OPTIMUM DEFINED
LAYERS WITH OPTIMUM ABSENCE OF IMPURITIES. THIS
REQUIREMENT WAS BEST SATISFIED, AS FOUND FROM A
COMPARISON OF ALUMINUM OF DIFFERENT DEGREES OF
PURITY, BY ERFTAL, A 99.9-% PURE COMMERCIAL
GRADE. COMPARISON OF DIFFERENT MEASURING METHODS
AND THE PREPARATION OF SPECIMENS OF KNOWN BARRIER-
LAYER THICKNESS DETERMINED THAT THE LATTER CAN BE
MEASURED THROUGH CAPACITANCE OF THE SPECIMENS AND
INDEPENDENTLY OF THE POSSIBLE EXISTENCE OF A COVER
LAYER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0K04

AD-641 932 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

NEW FINDINGS ON ANODIC OXIDATION OF ALUMINUM. (U)

JUN 66 13P KADEN, W. I
CONTRACT: DA-44-009-AMC-1563(T)
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL, TT T-1853-66, 66-62593

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NEUERE ERKENNTNISSE UND
ERFAHRUNDEN UEBER VERSCHIEDENE VARIATIONEN DER ANODISCHEN
OXYDATION DES ALUMINIUMS, TRANS. OF ALUMINIUM (WEST
GERMANY) V39 N7 P424-8 JUL 1963.

DESCRIPTORS: (*ALUMINUM, OXIDATION), (*ANODIC
COATINGS, ALUMINUM), WEST GERMANY, HARDNESS,
POROSITY, COLORS, DENSITY, PROCESSING (U)

ONE OF THE ANODIC-OXIDATION PROCESSES DISCUSSED IS
THE 'VEROXAL' PROCESS WHICH PRODUCES FILMS
CHARACTERIZED BY SPECIAL HIGH HARDNESS AND
CHARACTERISTIC COLORATION. THE VEROXAL PROCESS
PRODUCES FILMS WITH TINTS FROM SILVER YELLOW OVER
BROWN AND VARIOUS BRONZE TINTS TO BLACK. THE
COLORATIONS ARE ABSOLUTELY LIGHT PROOF AND ARE ALL
OBTAINED WITH THE SAME BATH COMPOSITION. THE COLOR
DIFFERENCES ARE OBTAINED BY EMPLOYING DIFFERENT
ALLOYS AND, TO A LIMITED EXTENT, THROUGH DIFFERENT
FILM THICKNESS. SHADING OF COLOR CAN BE OBTAINED
BY EMPLOYING DIFFERENT DENSITIES AND BATH
TEMPERATURES. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 7ZOM04

AD-651 088 11/3 7/4 13/8 11/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

MATTING OF ALUMINUM AND ITS ALLOYS,

(U)

MAR 67 17P SHAMES, S. I. I
REPT. NO. FTD-MT-65-395
MONITOR: TT 67-61678

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EMATALIROVANIE ALYUMINIYA I EGO
SPLAVOV. TRANS. OF MONO. ANODNAYA ZASHCHITA
METALLOV, MOSCOW, 1964 P222-32.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS),
(*ALUMINUM ALLOYS, ANODIC COATINGS), (*ANODIC
COATINGS, REACTION KINETICS), USSR, FILMS,
CORROSION INHIBITION, COATINGS, OXIDATION,
DIELECTRIC PROPERTIES, WEAR RESISTANCE, HARDNESS,
RESISTANCE (ELECTRICAL)

(U)

THE REPORT COVERS A STUDY OF FILM FORMATION
KINETICS AND THE PROPERTIES OF ANODIC OXIDE FILMS
PRODUCED IN AN OXALIC ACID ELECTROLYTE WITH THE
TITANIUM SALT $TiO(KC_2O_4)_2 \cdot 2H_2O$ ON
ALUMINUM AD-1 AND AL ALLOYS AMTSM AND DI6-
T (UNCLAD). SAMPLES WERE WIPED WITH BENZINE,
CHEMICALLY DEGREASED (BATH COMPOSITIONS GIVEN, 3
MIN., 60-70C FOR UNPOLISHED AND 3-5 MIN., 70-80C
FOR POLISHED SAMPLES), HOT AND COLD WATER RINSED,
BLEACHED (1-2 MIN., 40-50% HNO_3 , 18-20C),
THEN ANODIZED (BATH COMPOSITION GIVEN). THE
OPTIMAL CONDITIONS WERE 55C AND 40 MIN. AT 2 A/SQ
DM OR 30 MIN. AT 3 A/SQ DM. CORROSION RESISTANCE
WAS HIGH AND INCREASED WITH PROCESS DURATION.
INCREASING THE PH TO A VALUE OF 3 DID NOT AFFECT
FILM QUALITY. CORROSION RESISTANCE, ABRASIVE AND
FRICTION WEAR, HARDNESS, VOLUME RESISTIVITY AND
DIELECTRIC STRENGTH CHARACTERISTICS OF THESE FILMS
WERE BETTER THAN FOR STANDARD OXIDE FILMS PRODUCED IN
SULFATE OR OXALATE BATHS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-640 411 11/3
ATOMIC WEAPONS RESEARCH ESTABLISHMENT ALDERMASTON
(ENGLAND)

FACTORS AFFECTING THE ADHESION OF SURFACE COATINGS TO
ANODISED ALUMINIUM ALLOYS. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 OCT-31 MAR 66,
JUN 67 137P POPLEY, A. R. TERRY, C.
A. WALKER, P. I
REPT. NO. AWRE-0-22/67
MONITOR: D-MAT 146

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRCRAFT FINISHES, ALUMINUM
ALLOYS), (*ALUMINUM ALLOYS, *ANODIC COATINGS),
GREAT BRITAIN, PAINTS, ADHESION, CLEANING,
FINISHES & FINISHING, FAILURE(MECHANICS),
CONTAMINATION, EXPERIMENTAL DATA,
PERFORMANCE(ENGINEERING) (U)

AN INVESTIGATION WAS MADE OF THE FACTORS EFFECTING
THE ADHESION OF AIRCRAFT PAINT SYSTEMS TO ANODISED
ALUMINIUM AND ALUMINIUM ALLOYS. THE EQUIPMENT USED
IN THE CHROMIC AND SULPHURIC ACID PROCESSES ON BOTH
PLANT AND LABORATORY SCALE IS DESCRIBED IN DETAIL AND
ANALYSIS FIGURES FOR THE BATHS AND POST ANODISING
TREATMENTS ARE DETAILED. THE PANEL PREPARATION AND
EXPERIMENTAL PROCEDURE FOR THE DETERMINATION OF THE
ADHESION OF THE SURFACE COATINGS BY THE DIRECT PULL-
OFF SANDWICH TECHNIQUE ARE DESCRIBED. THE EFFECT
OF SUCH BATH COMPOSITION VARIABLES AS AGE OF BATH,
THE PRESENCE OF INORGANIC AND ORGANIC CONTAMINATION,
CR03 CONTENT AND TYPE OF WATER, TOGETHER WITH THE
EFFECT OF RINSING WATERS, CHROMATE CONTAMINATION,
SEALING TEMPERATURE, AND DELAY PERIOD BEFORE
APPLICATION OF THE PAINTS WAS STUDIED. THE
ADHESION OF THE TEST PAINT SYSTEMS WAS ASSESSED UNDER
THREE CONDITIONS OF AGEING. INORGANIC
CONTAMINATION PRESENT DURING POST ANODISING
TREATMENTS HAS AN ADVERSE EFFECT ON PAINT ADHESION,
BUT WHEN PRESENT DURING ANODISING, DOES NOT APPEAR TO
HAVE ANY MARKED EFFECT. ORGANIC CONTAMINATION
PRESENT DURING ANODISING IS ALSO ASSOCIATED WITH AN
INCREASE IN APPARENT ADHESION FAILURES PARTICULARLY
WHEN ETCH PRIMERS ARE USED. THE MAJORITY OF
ADHESION FAILURES ARE ASSOCIATED WITH THE ANODIC FILM
ON L70 ALLOY ESPECIALLY WHEN PHENOLIC MODIFIED ETCH
PRIMER TO DTD5555 IS USED.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-663 757 4/2
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF
METEOROLOGY

PERFORMANCE OF THIN FILM HUMIDITY SENSORS, (U)

OCT 67 76P DELPICCO, JOSEPH I
REPT. NO. SCIENTIFIC-1
CONTRACT: F19628-67-C-0228
PROJ: AF-6670
TASK: 667001
MONITOR: AFCRL 67-0543

UNCLASSIFIED REPORT

DESCRIPTORS: (•HYGROMETERS, •DIELECTRICS),
HUMIDITY, FILMS, WATER VAPOR, ABSORPTION,
SENSORS, ANODIC COATINGS, ALUMINA, ELECTROLYTES,
POLYMERS, SOLIDS, MICROPHOTOGRAPHY,
PERFORMANCE(ENGINEERING) (U)

VARIOUS HYGROSCOPIC MATERIALS HAVE BEEN CONSIDERED FOR USE AS THE THIN FILM DIELECTRIC IN A CONDENSER, WHICH IS TO BE USED AS THE HUMIDITY SENSING ELEMENT IN AN ELECTRIC HYGROMETER. THE REQUIREMENT OF SUCH A DIELECTRIC IS THAT IT APPROACH EQUILIBRIUM RAPIDLY AND DISPLAY BOTH REVERSIBLE AND REPRODUCIBLE HUMIDITY-ELECTRICAL CHARACTERISTICS. POLYMEROUS DIELECTRICS HAVE SHOWN AN EXTREMELY SLOW RATE OF RESPONSE AND IT IS SUSPECTED THAT THE RATE OF KNUDSEN DIFFUSION THROUGH MANY FINE TORTUOUS PORES IS RESPONSIBLE. ANODIC ALUMINUM OXIDE FILMS PRODUCED IN A SULFURIC ACID ELECTROLYTE HAVE RECENTLY SHOWN A RAPID RATE OF RESPONSE AS WELL AS A REPRODUCIBLE RESPONSE TOWARD HUMIDITY CHANGES. THE MAJOR LIMITATION HINDERING THE USE OF SUCH HUMIDITY SENSING ELEMENTS IS THEIR LONG-TERM CALIBRATION DRIFT, WHICH CAUSES THE ELEMENTS TO BECOME LESS SENSITIVE TOWARD HUMIDITY VARIATIONS. RESULTS HAVE SHOWN THAT A CHANGE IN THE CONCENTRATION OF VARIOUS SPECIES OF CHEMISORBED WATER VAPOR INITIALLY PRESENT ON THE PORE WALLS MAY BE RESPONSIBLE FOR THE OBSERVED CALIBRATION DRIFT AND THAT FURTHER EXPERIMENTATION IN THIS AREA IS WARRANTED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-665 243 11/6 7/4
FRANKFORD ARSENAL PHILADELPHIA PA

GAS PHASE ANODIZATION OF TANTALUM.

(U)

DESCRIPTIVE NOTE: REVISED ED.,

MAY 67 6P JENNINGS, T. A. MCNEILL,
W. SALOMON, R. E. ;
REPT. NO. FA-A67-22
MONITOR: AROD 423:2-C

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF THE
ELECTROCHEMICAL SOCIETY, V114 N11 P1134-7 NOV 1967.
SUPPLEMENTARY NOTE: MASTER'S THESIS. REVISION OF
MANUSCRIPT SUBMITTED 8 DEC 66.

DESCRIPTORS: (*TANTALUM, *ANODIC COATINGS),
VAPORS, OXIDATION, ELECTROCHEMISTRY, TANTALUM
COMPOUNDS, OXIDES, FILMS, ELECTROLYTIC CELLS,
GASES

(U)

IDENTIFIERS: TANTALUM OXIDE, OXIDE FILMS

(U)

THE ANODIC OXIDATION OF TANTALUM IN THE GAS PHASE
WAS STUDIED USING AN ELECTROMAGNETIC ION CATHODE.
THE ANODIC FILMS WERE PREPARED AT CONSTANT CURRENT
DENSITIES OF 1.0 AND 2.0 MA/SQ CM. THE GROWTH
CHARACTERISTICS OF ANODIC TANTALUM OXIDE FILMS, IN
THE GAS PHASE, WERE FOUND TO BE SIMILAR TO FILMS
PREPARED IN LIQUID ELECTROLYTES. A COMPARISON IS
MADE BETWEEN THE RESULTS OF THIS STUDY AND OTHER
REPORTED GAS PHASE REACTIONS WITH VARIOUS ANODE
SURFACES. THE TANTALUM OXIDE GROWTH, FOR THE
EXPERIMENTAL CONDITIONS REPORTED HERE, IS SHOWN TO BE
LINEARLY DEPENDENT ON THE TOTAL CHARGE PASSED IN THE
ANODE CIRCUIT DURING THE REACTION UP TO A FORMATION
VOLTAGE OF 200V. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-465 762 11/6 13/8
RENSSELAER POLYTECHNIC INST TROY N Y

ELECTRODE KINETIC BEHAVIOR OF METALLIC SURFACES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,
FEB 68 8P GREENE, NORBERT D. I
REPT. NO. TR-6
CONTRACT: NONR-591(17)
PROJ: PR-007-08-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*CORROSION, *ELECTROCHEMISTRY),
(*ANODIC COATINGS, *CORROSION INHIBITION),
ELECTRODES, DYNAMICS, STAINLESS STEEL, CRACKS,
ETCHING, POLARIZATION, SURFACES (U)

THE PRIMARY PURPOSE OF THIS PROGRAM WAS TO RELATE
THE ELECTRODE KINETIC AND CORROSION BEHAVIOR OF
METALLIC SURFACES TO METALLOGRAPHIC STRUCTURE AND
FUNCTION. ONLY THE MOST IMPORTANT RESULTS ARE
BRIEFLY SUMMARIZED IN THIS FINAL REPORT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-685 788 1375 1175
RENSSELAER POLYTECHNIC INST TROY N Y

PASSIVATION OF CREVICES DURING ANODIC
PROTECTION.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 68 25P FRANCE, W. DE WAYNE, JR.;
GREENE, NORBERT D.;
REPT. NO. TR-4
CONTRACT: NONR-591(17)
PROJ: PR-007-08-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO TECHNICAL REPORT NO. 3,
AD-624 017.

DESCRIPTORS: (*STAINLESS STEEL, ANODIC COATINGS),
(*CORROSION INHIBITION, STAINLESS STEEL),
CORROSION, CRACKS, POLARIZATION
IDENTIFIERS: *CREVICE PASSIVATION

(U)

(U)

THE PROTECTION OF CREVICES IS AN IMPORTANT PROBLEM
IN THE APPLICATION OF ANODIC PROTECTION.
THEORETICAL ANALYSES AND EXPERIMENTAL STUDIES WITH
A SPECIAL CREVICE ASSEMBLY SHOW THAT THE CREVICE-
PASSIVATING ABILITY OF A SYSTEM IS CONTROLLED BY
ELECTROLYTE CHARACTERISTICS, CREVICE GEOMETRY, AND
THE ELECTROCHEMICAL BEHAVIOR OF THE PROTECTED METAL.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-666 217 11/6 13/8
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER
FORT BELVOIR VA

CATASTROPHIC PITTING OF ALUMINUM-ALLOY (ALHAG 35)
CASTINGS DURING SULFURIC ACID ANODIZING, (U)

JAN 68 20P LASSER, HOWARD G. TASHER,
EMERSON;
REPT. NO. USAMERDC-1919
PROJ: DA-1C024401A328

UNCLASSIFIED REPORT

DESCRIPTORS: (ALUMINUM ALLOYS, CORROSION),
CASTINGS, ANODIC COATINGS, CORROSION INHIBITION,
CLEANING, DEFECTS (MATERIALS), MAGNESIUM
ALLOYS, SULFURIC ACID (U)

A PROBLEM CONCERNED WITH THE CATASTROPHIC PITTING
OF ALUMINUM-ALLOY (ALHAG 35) CASTINGS WHILE BEING
ANODIZED IS DESCRIBED. A METHOD FOR OVERCOMING
THIS PROBLEM MAKES USE OF RECOGNIZED PREANODIZING
CLEANING TECHNIQUES. A PROPOSED MECHANISM FOR THE
ENCOUNTERED CORROSION IS PRESENTED AS AN EXPLANATION
TO THIS PROBLEM. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-675 754 7/4 11/3
FRANKFORD ARSENAL PHILADELPHIA PA PITMAN-DUNN RESEARCH
LABS

ANODIC FILM GROWTH BY ANION DEPOSITION IN ALUMINATE,
TUNGSTATE, AND PHOSPHATE SOLUTIONS. (U)

FEB 63 7P MCNEILL, WILLIAM KRUSZ,
LEONARD L. I
PROJ: DA-1-T-06102-B-32-A
MONITOR: FA A63-26

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE
ELECTROCHEMICAL SOCIETY, V110 N8 P853-855 AUG 63.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 2 NOV
62.

DESCRIPTORS: (ANODIC COATINGS, ELECTROCHEMISTRY),
ALUMINUM, MAGNESIUM, NICKEL, IRON, ZINC,
BISMUTH, CADMIUM, COBALT, COPPER, FILMS,
ELECTRODEPOSITION, ALUMINATES, TUNGSTATES,
PHOSPHATES, PHOSPHATE COATINGS (U)

FILMS WERE OBTAINED BY ANODIC TREATMENT OF AL,
MG, NI, FE, ZN, BI, CD, CO, AND CU IN
0.1N NAALO2 AND AL, BI, CD, CU, AND
ZN IN 0.1N NA2WO4. A FORMATION VOLTAGE OF
30V WAS APPLIED FOR 10 MIN IN ALL CASES EXCEPT AL
IN NAALO2 WHERE THE MAXIMUM FORMATION VOLTAGE
WAS 100V. THE ANODIC FILMS WERE STUDIED BY
ELECTRON DIFFRACTION AND CHEMICAL ANALYSES. FILMS
OBTAINED IN NAALO2 SOLUTION APPEARED TO BE
BETA-AL2O3.3H2O, AND THOSE OBTAINED IN
NA2WO4 SOLUTION WERE OXIDES OF THE ANODE METAL,
OR MIXTURES OF THE ANODE METAL OXIDE WITH WO3.
THE INCORPORATION OF PHOSPHORUS COMPOUNDS IN ANODIC
FILMS FORMED ON AL IN 0.1N NA2HPO4 SOLUTIONS
WAS ALSO OBSERVED. THE MECHANISM OF ANION
DEPOSITION AND FILM GROWTH IN THESE SOLUTIONS IS
DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-676 446 11/6 7/4
FRANKFORD ARSENAL PHILADELPHIA PA PITHAN-DUNN RESEARCH
LABS

THE ANODIC SYNTHESIS OF CDS FILMS, (U)

MAR 65 7P MCNEILL, WILLIAM IGRUSS,
LEONARD L. HUSTED, DORSEY G. J.
PROJ: DA-1-T-061102-B-3-A
MONITOR: FA A65-18

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF THE ELECTROCHEMICAL
SOCIETY, V112 N7 P713-715 JUL 65.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 17 DEC
64.

DESCRIPTORS: (*SEMICONDUCTING FILMS, CADMIUM
SULFIDES), (*CADMIUM SULFIDES, SYNTHESIS),
CADMIUM COMPOUNDS, BARRIER COATINGS, FILMS,
DIELECTRIC PROPERTIES, X-RAY DIFFRACTION ANALYSIS,
ANODES(ELECTROLYTIC CELL), ANODIC COATINGS,
THICKNESS, INTERFEROMETERS, SODIUM COMPOUNDS,
SULFIDES, CADMIUM ALLOYS, ETHANOLS (U)
IDENTIFIERS: SODIUM SULFIDES (U)

CD IS SHOWN TO BEHAVE AS A TYPICAL 'VALVE ANODE' IN
SOLUTIONS OF $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$ IN ETHANOL AND BECOMES
COVERED WITH A FILM WHICH ACTS AS AN ELECTRICAL
BARRIER, EXHIBITS INTERFERENCE COLORS, INCREASES IN
THICKNESS AS VOLTAGE IS INCREASED, AND GIVES RISE TO
SPARKING AT VOLTAGES IN EXCESS OF 150 V.
VOLTAGE-TIME CURVES, FILM THICKNESS AND ELECTRICAL
RESISTANCE, AND X-RAY DIFFRACTION ANALYSES SHOWING
THE FILMS TO BE CDS ARE PRESENTED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-680 11/3 11/6
MINISTRY OF TECHNOLOGY ORPINGTON (ENGLAND) TIL REPORTS
CENTRE

EVALUATION OF HARD ANODISING AS A WEAR RESISTANT
COATING FOR ALUMINUM ALLOYS WITH PARTICULAR REFERENCE
TO ITS USE AS A SUBSTRATE FOR SOLID PHASE
LUBRICANTS. (U)

JUN 68 14/P KEYWORTH, D. I
REPT. NO. S/T-MEMO-6-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: CONTAINS ADDENDUM.

DESCRIPTORS: (ALUMINUM ALLOYS, ANODIC COATINGS),
WEAR RESISTANCE, COPPER ALLOYS, MANGANESE ALLOYS,
NICKEL ALLOYS, ZINC ALLOYS, LUBRICANTS,
ENVIRONMENTAL TESTS, FRICTION, COLD WORKING,
FATIGUE (MECHANICS), SURFACE PROPERTIES,
CORROSION RESISTANCE, GREAT BRITAIN (U)

THE REPORT DESCRIBES INVESTIGATIONS OF:
COMPARISON OF MAJOR TYPES OF HARD ANODIC FILM;
EXAMINATION OF ABRASION RESISTANCE; WEAR RESISTANCE
WITH VARIOUS SURFACE TREATMENTS, WITH OR WITHOUT
SOLID PHASE LUBRICANT; MEASUREMENT OF COEFFICIENT OF
FRICTION WHEN SUITABLE LUBRICANTS ARE ADDED;
MEASUREMENT OF BEARING PROPERTIES ON FILMS OF VARIOUS
THICKNESSES; EFFECT ON FATIGUE PROPERTIES OF SHOT-
PEENING, SURFACE FINISHING PRIOR TO ANODISING AND
VARIOUS SEALING TREATMENTS AFTER ANODISING; CORROSION
RESISTANCE WHEN FILM IS SEALED WITH VARIOUS SOLID
PHASE LUBRICANTS AND IN CONTACT WITH VARIOUS
MATERIALS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-685 577 11/3 11/6
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH SOLID STATE
PHYSICS LAB

DIELECTRIC PROPERTIES OF SURFACE OXIDES ON
ALUMINUM;

(U)

FEB 69 65P BEGEMANN, S. H. A. SMITH,
A. W. I
REPT. NO. DI-82-0824

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLOYS, ANODIC COATINGS),
(*ANODIC COATINGS, DIELECTRIC PROPERTIES),
SURFACE PROPERTIES, ELECTROCHEMISTRY, ALUMINA,
OXIDES, SUBSTRATES, AMMONIUM COMPOUNDS,
TARTRATES, CHROMIC ACIDS, MEASUREMENT,
THICKNESS

(U)

IDENTIFIERS: AMMONIUM TARTRATES

(U)

DIELECTRIC PROPERTY MEASUREMENTS HAVE BEEN
PERFORMED ON VARIOUS TYPES OF ALUMINUM SURFACE
OXIDES. THE RESULTS, OBTAINED WITH DIFFERENT
ELECTRODE MATERIALS ARE INTERPRETED BY ANALOGY WITH A
SERIES PARALLEL NETWORK OF CAPACITORS AND RESISTORS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-686 835 11/3
BRITISH COLUMBIA RESEARCH COUNCIL VANCOUVER

HIGH RESISTANCE ANODIC OXIDE FILMS ON ALUMINIUM,

(U)

OCT 65 6P HARKNESS, A. C. ; YOUNG, L. ;
MONITOR: DRB REPRINT-2707

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN CANADIAN JNL. OF
CHEMISTRY, V44 P2409-2413 1966. NO COPIES
FURNISHED.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BRITISH
COLUMBIA UNIV., VANCOUVER. DEPT. OF ELECTRICAL
ENGINEERING.

DESCRIPTORS: (*ALUMINUM, *ANODIC COATINGS),
FILMS, THICKNESS, DIELECTRIC PROPERTIES,
RESISTANCE(ELECTRICAL), BORATES, SOLUTIONS,
CANADA

(U)

THE THICKNESSES OF OXIDE FILMS FORMED IN AQUEOUS
BORATE SOLUTIONS WERE OBTAINED BY THE
SPECTROPHOTOMETRIC METHOD AFTER DEVELOPING THE
INTERFERENCE COLORS BY EVAPORATING A VERY THIN FILM
OF GOLD OR BISMUTH ONTO THE OXIDE. THE REFRACTIVE
INDEX OF THE STRIPPED FILMS WAS DETERMINED BY THE
BECKE IMMERSION METHOD AS 1.57 TO 1.58 AT 5 900A
WAVELENGTH. THE DIELECTRIC CONSTANT WAS ESTIMATED
AS 9.8 PLUS OR MINUS 0.5.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-697 117

11/3

BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH

ELECTRICAL IMPEDANCE OF ALUMINUM SURFACE OXIDE,

(U)

SEP 69

32P

SMITH, ALAN W. POLLOCK, ANN

REPT. NO. D1-82-0926

UNCLASSIFIED REPORT

DESCRIPTORS: (ANODIC COATINGS, ELECTRICAL IMPEDANCE), ALUMINUM, DIELECTRIC FILMS, DIELECTRIC PROPERTIES, OXIDES, SURFACE ROUGHNESS

(U)

THE IMPEDANCE OF SURFACE OXIDES, PRESENT AFTER ETCHING OR OTHER TREATMENT OF ALUMINUM, IS SHOWN TO BE CHARACTERISTIC OF THAT OF AMORPHOUS DIELECTRICS WITH A FREQUENCY INDEPENDENT DIELECTRIC LOSS. RESULTS WITH BOTH ELECTROLYTIC SOLUTION CONTACTS AND EVAPORATED METAL CONTACTS INDICATE A THIN BARRIER LAYER COVERED BY A THICKER PERMEABLE LAYER AS OCCURS ON A POROUS, ANODIZED SURFACE. METHODS FOR DETERMINING THE DIELECTRIC CONSTANT AND THE ROUGHNESS ARE DEVELOPED. THE DIELECTRIC LOSS IS RELATED TO HYDRATION OF THE SURFACE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-697 544 11/3 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SCIENCE PICTORIAL. NUMBER 6, 1966 (SELECTED
ARTICLES);

(U)

MAY 69 12P CHU, FU-NING ICHIAO, YING ;
REPT. NO. FTD-HT-23-839-68
PROJ: FTD-7230178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF K'O HSUEH HUA
PAO (MAINLAND CHINA) N6 P242-243 1966.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS);
(*POWER SUPPLIES, WAVE TRANSMISSION); CERAMIC
COATINGS, DIRECT CURRENT, RADIO TRANSMISSION,
UNDERGROUND STRUCTURES, CORROSION, MICROWAVES;
RADIOFREQUENCY POWER, CHINA
IDENTIFIERS: TRANSLATIONS

(U)

(U)

CONTENTS: ALUMINUM CERAMIC ANODIC OXIDATION;
AND POWER TRANSMISSION WITHOUT CONDUCTORS.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-699 350 11/3
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER
FORT BELVOIR VA

DEVELOPMENT OF A CONTINUOUS, HARD-ANODIZED
ALUMINUM SURFACE, (U)

MAY 69 15P HARRIS, FRANK L. ILEVINE,
SIDNEY I
REPT. NO. USAHERDC-1952
PROJ: DA-1-T-062105-A-328
TASK: 1-T-062105-A-32803

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM ALLOYS),
BARRIER COATINGS, CRACKS, CORROSION INHIBITION (U)

A METHOD IS DESCRIBED FOR MINIMIZING THE EFFECTS OF
THE DISCONTINUITIES INHERENT IN HARD-ANODIZED
COATINGS ON ALUMINUM BY THE INTRODUCTION OF A
SECONDARY ANODIC FILM. PHOTOMICROGRAPHS SHOW THE
LOCATION OF THE SECONDARY COATING BENEATH THE
ORIGINAL HARD-ANODIZED FINISH. DATA ARE PRESENTED
WHICH INDICATE THAT THE METHOD DESCRIBED HAS NO ILL
EFFECT ON THE ORIGINAL ABRASION RESISTANCE AND THAT
THE CONTINUITY OF THE COATING IS SIGNIFICANTLY
INCREASED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-711 008 11/6
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND
ENGINEERING DIRECTORATE

ELLIPSO-METRIC STUDY OF THE OXIDATION OF MILD STEEL
IN AQUEOUS SOLUTIONS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 70 28P BORNONG, BERNARD J. ;
REPT. NO. AHSWE-RE-70-129
PROJ: DA-1-T-061102-B-13-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *CORROSION), (*CORROSION
INHIBITION, *ANODIC COATINGS), ELECTROCHEMISTRY,
OXIDATION, SURFACES, CHLORIDES, SULFONATES,
AMINES, ADSORPTION, MONOMOLECULAR FILMS, BARIUM
COMPOUNDS (U)

IDENTIFIERS: *NAPHTHALENE SULFONIC ACID/DINONYL-
(BARIUM-SALT), NAPHTHALENE SULFONATES,
*OCTADECYLAMINES, POLARIMETRY (U)

COMBINED ELLIPSO-METRIC AND POTENTIOSTATIC
MEASUREMENTS WERE MADE ON THE OXIDATION OF MILD STEEL
IN PH 7.4 BORATE-BORIC ACID BUFFER SOLUTIONS. THE
ELLIPSO-METRIC RESULTS ARE DESCRIBED IN THIS REPORT.
THE POTENTIOSTATIC DATA ARE PRESENTED IN A REPORT
ON ANOTHER WORK UNIT. ANODIC FILM THICKNESSES ON
THE STEEL SURFACE RANGED FROM 19 TO 80A IN THE
ANODIC OVERPOTENTIAL RANGE OF 0.7 TO 1.7 VOLTS.
FILM THICKNESSES INCREASED RAPIDLY NEAR THE
POTENTIAL FOR PITTING. CHLORIDE IONS IN THE
SOLUTION NARROWED THE POTENTIAL RANGE FOR STABILITY
OF THE ANODIC FILM, BUT DID NOT CHANGE ITS THICKNESS
APPRECIABLY. FILMS FORMED BY AGING THE STEEL IN THE
BUFFER SOLUTION WITH NO POTENTIAL APPLIED, DEVELOPED
TO AVERAGE THICKNESSES OF 58-60A IN THREE HOURS.
ADSORBED FILMS OF BARIUM DINONYLNAPHTHALENE
SULFONATE DESORBED RAPIDLY FROM THE STEEL SURFACE
UNDER ANODIC POLARIZATION, BUT WERE STABLE IN AN
OVERPOTENTIAL RANGE OF 0.1 TO 0.2 VOLT CATHODIC.
DESORPTION OF THE SULFONATE FILM, AS OBSERVED
ELLIPSO-METRICALLY, OCCURRED AT AN ELECTRODE POTENTIAL
OF APPROXIMATELY -400 MILLIVOLTS VS. THE STANDARD
CALOMEL ELECTRODE. THE BEHAVIOR OF THE
OCTADECYLAMINE ADSORBED FILMS WAS SIMILAR TO THAT OF
THE SULFONATE. STEARIC ACID UNDER SOME CONDITIONS
REACTS WITH THE STEEL OR ITS OXIDE-COATED SURFACE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-704 882

11/6

NATIONAL BUREAU OF STANDARDS WASHINGTON D C

THE ROLE OF PASSIVE FILM GROWTH KINETICS AND
PROPERTIES IN STRESS CORROSION SUSCEPTIBILITY. (U)

DESCRIPTIVE NOTE: TECHNICAL SUMMARY REPT. NO. 1, 1 MAR
69-28 FEB 70.

FEB 70 56P

KRUGER, JEROME I ESCALANTE,

EDWARD IAMBROSE, JOHN I

REPT. NO. NBS-10191

CONTRACT: NAONR-18-69

PROJ: NBS-3120446, NR-036-082

UNCLASSIFIED REPORT

DESCRIPTORS: (STRESS CORROSION, ANODIC COATINGS),
REACTION KINETICS, FILMS, IRON, COPPER, BRASS,
DUCTILITY

IDENTIFIERS: PASSIVITY

(U)

(U)

THE ROLE OF PASSIVATION KINETICS, FILM DUCTILITY,
AND TARNISH FILM FORMATION IN STRESS CORROSION
CRACKING WERE EACH EXAMINED IN THE FOLLOWING
STUDIES: (1) ELLIPSOMETRY MEASUREMENTS OF
FILM GROWTH KINETICS ON IRON HAVE BEEN MADE FOR TWO
ANIONS WHOSE SOLUTION CAUSE STRESS CRACKING OF STEEL
(NITRATE AND HYDROXIDE) AND TWO THAT DO NOT
(CHLORIDE AND NITRITE). (2) A TECHNIQUE HAS
BEEN DEVELOPED TO MEASURE FILM DUCTILITY DIRECTLY.
THIS TECHNIQUE COUPLES AN ELLIPSOMETER WITH A
TENSILE MACHINE. THIN FILMS ON TA SHOW A
DUCTILITY OF 3-4% IN THE PRESENCE AND ABSENCE OF
F(-), AN ION THOUGHT TO DECREASE DUCTILITY.
(3) PURE COPPER FORMS TARNISH FILMS IN CUPRIC
ACETATE AND SULFATE SOLUTIONS. IT IS SUSCEPTIBLE
TO STRESS CORROSION CRACKING IN CUPRIC ACETATE
SOLUTION. IN THE ABSENCE OF STRESS, OXIDE FORMS
ALL OVER THE COPPER SURFACE, WHILE STRESS
CONCENTRATES OXIDE FORMATION AT THE GRAIN BOUNDARIES.
THESE EXPERIMENTS POINT OF A BRITTLE-FILM RUPTURE
MECHANISM OF STRESS CRACKING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-711 008

11/6

ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND
ENGINEERING DIRECTORATE

ELLIPSOMETRIC STUDY OF THE OXIDATION OF MILD STEEL
IN AQUEOUS SOLUTIONS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

MAR 70 28P

BORNONG, BERNARD J. :

REPT. NO. AMSWE-RE-70-129

PROJ: DA-1-T-061102-B-13-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *CORROSION), (*CORROSION
INHIBITION, *ANODIC COATINGS), ELECTROCHEMISTRY,
OXIDATION, SURFACES, CHLORIDES, SULFONATES,
AMINES, ADSORPTION, MONOMOLECULAR FILMS, BARIUM
COMPOUNDS (U)

IDENTIFIERS: *NAPHTHALENE SULFONIC ACID/DINONYL-
(BARIUM-SALT), NAPHTHALENE SULFONATES,
*OCTADECYLAMINES, POLARIMETRY (U)

COMBINED ELLIPSOMETRIC AND POTENTIOSTATIC
MEASUREMENTS WERE MADE ON THE OXIDATION OF MILD STEEL
IN PH 7.4 BORATE-BORIC ACID BUFFER SOLUTIONS. THE
ELLIPSOMETRIC RESULTS ARE DESCRIBED IN THIS REPORT.
THE POTENTIOSTATIC DATA ARE PRESENTED IN A REPORT
ON ANOTHER WORK UNIT. ANODIC FILM THICKNESSES ON
THE STEEL SURFACE RANGED FROM 19 TO 88A IN THE
ANODIC OVERPOTENTIAL RANGE OF 0.7 TO 1.7 VOLTS.
FILM THICKNESSES INCREASED RAPIDLY NEAR THE
POTENTIAL FOR PITTING. CHLORIDE IONS IN THE
SOLUTION NARROWED THE POTENTIAL RANGE FOR STABILITY
OF THE ANODIC FILM, BUT DID NOT CHANGE ITS THICKNESS
APPRECIABLY. FILMS FORMED BY AGING THE STEEL IN THE
BUFFER SOLUTION WITH NO POTENTIAL APPLIED, DEVELOPED
TO AVERAGE THICKNESSES OF 58-60A IN THREE HOURS.
ADSORBED FILMS OF BARIUM DINONYLNAPHTHALENE
SULFONATE DESORBED RAPIDLY FROM THE STEEL SURFACE
UNDER ANODIC POLARIZATION, BUT WERE STABLE IN AN
OVERPOTENTIAL RANGE OF 0.1 TO 0.2 VOLT CATHODIC.
DESORPTION OF THE SULFONATE FILM, AS OBSERVED
ELLIPSOMETRICALLY, OCCURRED AT AN ELECTRODE POTENTIAL
OF APPROXIMATELY -400 MILLIVOLTS VS. THE STANDARD
CALOMEL ELECTRODE. THE BEHAVIOR OF THE
OCTADECYLAMINE ADSORBED FILMS WAS SIMILAR TO THAT OF
THE SULFONATE. STEARIC ACID UNDER SOME CONDITIONS
REACTS WITH THE STEEL OR ITS OXIDE-COATED SURFACE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-722 490 11/3
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL
ENGINEERING

PLASMA ANODIZATION.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 5 NOV 69-31
OCT 70,

MAR 71 56P PULFREY, DAVID L. IYOUNG,

LAWRENCE ;

CONTRACT: F33615-70-C-1225

MONITOR: AFAL TR-70-328

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, PLASMA MEDIUM),

(*DIELECTRIC FILMS, PLASMA MEDIUM), TANTALUM,

NIOBIUM, SILICON, SILICON DIOXIDE

(U)

IDENTIFIERS: *ANODIZING, THIN FILMS

(U)

THE ANODIZATION OF TA, NB AND SI WAS CARRIED OUT IN OXYGEN PLASMAS GENERATED BY BOTH HOT AND COLD CATHODE DISCHARGES AND BY AN EXTERNALLY-COUPLED R.F. VOLTAGE. FOR THE ANODIZATION OF NB IN A.D.C. COLD CATHODE DISCHARGE, THE EXISTENCE OF A HIGH FIELD IONIC CONDUCTION MECHANISM AS THE OPERATIVE GROWTH PROCESS HAS BEEN CONFIRMED. HOWEVER, ON THE BASIS OF A SIMPLE MODEL FOR THE METAL/OXIDE/PLASMA SYSTEM, IT APPEARS THAT UNDER SOME CIRCUMSTANCES THE FIELD IN THE OXIDE IS CONTROLLED BY THE LARGE ELECTRONIC CURRENTS FLOWING, AND FURTHERMORE, THAT THE NEGATIVE OXYGEN IONS RELEVANT TO THE OXIDE GROWTH ARE FORMED EITHER AT THE SAMPLE SURFACE OR IN THE SHEATH SURROUNDING IT. ANODIZATION IN A HOT CATHODE DISCHARGE IMPROVES THE OXIDE GROWTH RATE BUT INTRODUCES PROBLEMS AS REGARDS SAMPLE HEATING AND CONTAMINATION. THESE LATTER TWO FACTORS CAN LEAD TO REDUCED QUALITY OF THE RESULTING DIELECTRIC FILMS. ANODIZATION OF SI IN AN R.F. PLASMA GIVES RELATIVELY FAST GROWTH RATES (ABOUT 15 A/MIN) AND PRELIMINARY DATA INDICATE THAT THE MECHANISM OF OXIDE GROWTH INVOLVES AN IMPACT IONIZATION PROCESS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-725 166 11/6
NATIONAL BUREAU OF STANDARDS WASHINGTON D C

THE ROLE OF PASSIVE FILM GROWTH KINETICS
AND PROPERTIES IN STRESS CORROSION
SUSCEPTIBILITY.

(U)

DESCRIPTIVE NOTE: TECHNICAL SUMMARY REPT. NO. 2, 1 MAR
70-28 FEB 71
MAY 71 67P KRUGER, JEROME IAMBROSE, JOHN
R. ESCALANTE, EDWARD ;
REPT. NO. NBS-10594
CONTRACT: NAONR-18-69
PROJ: NBS-3120448, NR-036-082

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO TECHNICAL SUMMARY REPT. NO.
1, AD-704 882.

DESCRIPTORS: (•STRESS CORROSION, REACTION
KINETICS), (•ANODIC COATINGS, DUCTILITY),
STEEL, FRACTURE (MECHANICS), NITRATES, FILMS,
ALUMINUM, TANTALUM, ALUMINUM ALLOYS
IDENTIFIERS: PASSIVITY, METAL OXIDE FILMS

(U)
(U)

A NEW TECHNIQUE HAS BEEN DEVELOPED FOR STUDYING THE
RATE OF REPASSIVATION OF A STRESSED METAL SURFACE
EXPOSED BY FILM RUPTURE. THIS TECHNIQUE, WHICH
REMOVES THE FILM ON A METAL BY ABRASION AND THEN
FOLLOWS FILM REGROWTH AND METAL DISSOLUTION BY
TRANSIENT ELLIPSOMETRY AND CURRENT TRANSIENTS, WAS
APPLIED TO LOW CARBON STEEL IN A NITRATE SOLUTION
WHERE IT STRESS CRACKS AND A NITRITE WHERE IT DOES
NOT. THE RATE OF REPASSIVATION WAS GREATER IN THE
NON-SUSCEPTIBLE SOLUTION WHILE THE RATIO OF CURRENT
GOING INTO FILM FORMATION TO THAT PRODUCING METAL
DISSOLUTION WAS LESS. ANOTHER NEW TECHNIQUE WAS
DEVELOPED WHICH MEASURES THE DUCTILITY OF FILMS ON
METAL SURFACES BY DETERMINING BY ELLIPSOMETRY THE
AMOUNT OF THINNING THE FILM UNDERGOES UPON STRAINING
THE METAL. THE TECHNIQUE GIVES VALUES FOR MAXIMUM
DUCTILITY OF THE FILM RATHER THAN THE FRACTURE STRAIN
THAT OTHER TECHNIQUES GIVE. MEASUREMENTS WERE MADE
ON ANODIC FILMS ON TA, AL AND AL-4% CU.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-725 469 7/4 11/2
NAVAL RESEARCH LAB WASHINGTON D C

ANODIC CRYSTALLIZATION ON PURE AND ANTIMONIAL
LEAD IN SULFURIC ACID.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
MAY 71 3:30P BURBANK, JEANNE I
REPT. NO. NRL-7256
PROJ: NRL-C05-14; RR010-01-45-4755

UNCLASSIFIED REPORT

DESCRIPTORS: (*LEAD, *ANODIC COATINGS),
(*ELECTRODES, LEAD), (*CRYSTALLIZATION, *LEAD
COMPOUNDS), OXIDES, ELECTROCHEMISTRY, CRYSTAL
STRUCTURE, ANTIMONY ALLOYS, LEAD ALLOYS, SULFATES,
X-RAY DIFFRACTION ANALYSTS
IDENTIFIERS: *LEAD OXIDES, LEAD SULFATES

(U)

(U)

ELECTROCHEMICAL CYCLING, X-RAY DIFFRACTION, AND
ELECTRON MICROSCOPY WERE USED TO STUDY ANODIC
CRYSTALLIZATION ON PURE AND ANTIMONIAL PB IN
H2SO4. ON PURE PB A MAXIMUM ELECTROCHEMICAL
CAPACITY DEVELOPED THAT DID NOT INCREASE WITH FURTHER
CYCLING. THE ANODIC COATING WAS COMPRISED OF SMALL
NEEDLELIKE CRYSTALS THAT GREW WITH CYCLING. THE
AMOUNT AND CRYSTALLINITY OF BETA PBO2 GRADUALLY
INCREASED IN A SOFT POROUS OUTER LAYER. ATTACHED TO
THE METAL WAS A LAYER OF ALPHA PBO2. ON THE
SB-PB ALLOY THE CAPACITY CONTINUALLY INCREASED
WITH CYCLING. A COMPACT EUTECTOIDAL COATING OF
SMALL CRYSTALS OF ALPHA AND BETA PBO2 WAS FORMED.
IT WAS CONCLUDED THAT ON PURE PB BETA PBO2
DOES NOT BOND TO ALPHA PBO2 AND THAT SB IN THE
SB-PB ALLOY ACTS AS A NUCLEATING CATALYST FOR
BETA PBO2 IN THE CORROSION PRODUCT ATTACHED TO
THE METAL SURFACE. ANTIMONY ALSO PROMOTES
INTERCRYSTAL BONDING BETWEEN THE TWO POLYMORPHS OF
PBO2. THE MORPHOLOGIES OF THE PBO2
CRYSTALS WERE ALSO STUDIED. THE CRYSTALS FORMED ON
SOAKING IN THE ELECTROLYTE, AND DURING DISCHARGE OF
PBO2 COATINGS, DEVELOPED BY ELECTROCHEMICAL
CYCLING, WERE EXAMINED. WELL-DEVELOPED PRISMS,
DENDRITES, AND HOPPER CRYSTALS WERE OBSERVED. THE
DISCHARGE OF THE ANTIMONIAL COATINGS APPEARED TO BE
LIMITED BY THE GROWTH RATE OF THE PBO2 CRYSTALS.
THE FUNDAMENTAL ASPECTS OF ELECTROCRYSTALLIZATION
ARE DISCUSSED, AND A CRYSTAL CHEMICAL MECHANISM IS
PROPOSED FOR THE ACTION OF SB IN THE PBO2
ELECTRODE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-728 431 11/3 10/3
NAVAL RESEARCH LAB WASHINGTON D C

CYCLING ANODIC COATINGS ON PURE AND
ANTIMONIAL LEAD IN H2SO4,

(U)

71 23P BURBANK, JEANNE I

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN POWER SOURCES, V3 P13-34
1971.

DESCRIPTORS: (*ANODIC COATINGS, *LEAD), (*LEAD
ALLOYS, ANODIC COATINGS), (*STORAGE BATTERIES,
ELECTRODES), SULFURIC ACID, ANTIMONY ALLOYS,
X-RAY DIFFRACTION ANALYSIS, ELECTRON MICROSCOPY
IDENTIFIERS: LEAD ACID CELLS

(U)
(U)

ELECTROCHEMICAL CYCLING, X-RAY DIFFRACTION AND
ELECTRON MICROSCOPY WERE USED TO STUDY ANODIC
COATINGS ON PURE AND ANTIMONIAL LEAD. ON PURE LEAD
A MAXIMUM CAPACITY DEVELOPED THAT DID NOT INCREASE
WITH FURTHER CYCLING. THE ANODIC OXIDE COMPRISED
SMALL NEEDLE-LIKE CRYSTALS WHICH GREW WITH CYCLING.
THERE WAS A GRADUAL INCREASE IN THE AMOUNT AND
CRYSTALLINITY OF BETA-PB02 IN A SOFT POROUS OUTER
LAYER. ATTACHED TO THE METAL WAS A LAYER OF ALPHA-
PB02. ON ANTIMONY ALLOY THE CAPACITY
CONTINUALLY INCREASED WITH CYCLING. A COMPACT
COATING OF SMALL CRYSTALS OF ALPHA- AND BETA-PB02
WAS FORMED. IT WAS CONCLUDED THAT BETA-PB02
DOES NOT BOND TO ALPHA-PB02 AND THAT ANTIMONY
ACTS AS A NUCLEATING CATALYST FOR BETA-PB02 IN
THE CORROSION PRODUCT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-734 864 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PROTECTION OF ALUMINUM IN A MARINE CLIMATE,

(U)

OCT 71 7P STRAT, L. IOPREAN, L. I
REPT. NO. FTD-HC-23-964-71
PROJ: AF-6010
TASK: 601080

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
REVISTA CONSTRUCTIBILOR SI A MATERIALELOR DE
CONSTRUCTII (ROMANIA) V21 N9 P477-479 1969.

DESCRIPTORS: (*COATINGS, CORROSION INHIBITION),
(*ALUMINUM ALLOYS, *CORROSION INHIBITION),
(*ANODIC COATINGS, ALUMINUM ALLOYS), DYES,
ELECTROPLATING, PAINTS, ROMANIA
IDENTIFIERS: TRANSLATIONS

(U)

(U)

THE FOLLOWING CONCLUSIONS WERE DRAWN FROM THE
EXPERIMENTS: ANODIC OXIDATION COMPACTED WITH
ORGANIC DYES, APPLIED ON POLISHED ALUMINUM EXHIBITED
THE BEST BEHAVIOR; UNPOLISHED ALUMINUM REQUIRES A 20
MU M THICK LAYER TO ENSURE A SERVICE LIFE OF MORE
THAN 5 YEARS; IN ORDER TO RETAIN THE DECORATIVE
APPEARANCE, A SUNLIGHT-RESISTANT DYE MUST BE USED;
PAINTING OF THE ALUMINUM IS VERY EFFICIENT, ASSUMING
THAT THE PAINTS ARE RESISTANT AGAINST THE ENVIRONMENT
TO WHICH THEY ARE EXPOSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-732 718 11/3
ILLINOIS UNIV URBANA DEPT OF METALLURGY AND MINING
ENGINEERING

ELECTROLYTIC BREAKDOWN OF ANODIC FILMS ON
ALUMINUM,

(U)

71 5P ZAHAVI, J. IMETZGER, M. I
CONTRACT: DA-31-124-ARO(D)-289
PROJ: DA-2-D-061102-B-32-D, AROD-5063-MC
MONITOR: AROD 5063:6-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ANNUAL PROCEEDINGS,
ELECTRON MICROSCOPY SOCIETY OF AMERICA (29TH),
BOSTON, MASS., 1971.

SUPPLEMENTARY NOTE: SPONSORED IN PART BY THE ATOMIC
ENERGY COMMISSION, WASHINGTON, D. C., AND THE
ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON,
D. C.

DESCRIPTORS: (ANODIC COATINGS;
DEFECTS(MATERIALS)), ELECTRON MICROSCOPY,
ALUMINUM, CORROSION.

(U)

ELECTRON MICROSCOPY HAS BEEN USED TO STUDY THE
ANODIC FILMS ON ALUMINUM. EVIDENCE WAS FOUND OF
MANY BREAKDOWN AND REPAIR EVENTS ON BOTH GROSS AND
FINE SCALES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-735 631 11/3

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SURFACE FINISHES FOR ALUMINUM PRODUCTS BY
DIRECT ANODIZING,

(U)

NOV 71 14P CSOKAN, PAL ;
REPT. NO. FTD-HG-23-1536-71
PROJ: AF-6010
TASK: 601080

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
MAGYAR ALUMINUM (HUNGARY) V6 N12 P360-363 1969.

DESCRIPTORS: (ANODIC COATINGS, ALUMINUM ALLOYS),
COLORS, CORROSION INHIBITION, PHYSICAL PROPERTIES,
HUNGARY

(U)

IDENTIFIERS: TRANSLATIONS

(U)

THE ARTICLE DISCUSSES THE NEED FOR A MORE UP-TO-
DATE SURFACE FINISHING TECHNOLOGY FOR ALUMINUM
PRODUCTS BY DIRECT COLOR ANODIZING.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-737 159 20/12 7/4
FRANKFORD ARSENAL PHILADELPHIA PA

ELECTRICAL PROPERTIES OF ANODIC OXIDE FILMS
OF TA, NB, ZR, TI, W, AND V FORMED BY
THE ION-CATHODE METHOD. (U)

DESCRIPTIVE NOTE: TECHNICAL RESEARCH ARTICLE,
AUG 71 8P HUSTED, DORSEY G. (GRUSS,
LEONARD W. (MACKUS, THOMAS J.)
REPT. NO. FA-A71-11
PROJ: DA-2-O-0611-D-2-B-31-E, DA-1-T-061102-B-
32-A

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF THE
ELECTROCHEMICAL SOCIETY, SOLID STATE SCIENCE,
V118 N12 P1989-1992 DEC 71.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 8 FEB
71.

DESCRIPTORS: (*REFRACTORY METALS, ANODIC
COATINGS), (*ANODIC COATINGS, ELECTRICAL
PROPERTIES), FILMS, OXIDES, TANTALUM COMPOUNDS,
NIOBIUM COMPOUNDS, ZIRCONIUM OXIDES, TUNGSTEN
COMPOUNDS, VANADIUM COMPOUNDS (U)
IDENTIFIERS: *OXIDE FILMS, TANTALUM OXIDES,
ZIRCONIUM OXIDES, TUNGSTEN OXIDES, VANADIUM
OXIDES, AMORPHOUS MATERIALS (U)

AMORPHOUS OXIDE FILMS HAVE BEEN GROWN ON ZR,
TI, W, TA, NB, AND V BY IONIZED GAS
ANODIZATION USING THE ION CATHODE AS A SOURCE OF
NEGATIVE IONS. FILMS WERE GROWN ON EACH METAL AT
CONSTANT CURRENT TO 175V FOLLOWED BY CONSTANT
VOLTAGE FOR ABOUT 4 HR. SEVERAL ELECTRICAL AND
OPTICAL PROPERTIES WERE MEASURED FOR THE ANODIC FILMS
PRODUCED ON THESE REFRACTORY METALS. THE PROPERTIES
OF FILMS PREPARED BY THE ION CATHODE METHOD ARE
COMPARED WITH THOSE PRODUCED BY PLASMA AND SOLUTION
METHODS REPORTED BY OTHERS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-737 876 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

OXIDE LAYER ON THE SURFACE OF OBJECTS
COATED WITH ALUMINUM IN VACUUM, (U)

NOV 71 7P SVOBODA, MIROSLAV ISOUREK,
VLASTIMIL IKOS, JIRI ;
REPT. NO. FTD-HC-23-1534-71
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
PATENT (CZECHOSLOVAKIA) 134 171 P1-2 1969.

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM
COATINGS), VAPOR PLATING, VACUUM APPARATUS,
ALUMINA, STEAM, AMMONIA, OZONE, AMINES,
ADDITIVES, PATENTS, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS (U)

IT IS SHOWN THAT THE METHOD OF MAKING AN OXIDE
LAYER ON THE SURFACE OF OBJECTS WHICH HAVE BEEN
COATED WITH ALUMINUM IN VACUUM IS CHARACTERIZED BY
THE FACT THAT A CLEANED OBJECT WHICH HAS BEEN COATED
WITH ALUMINUM IN VACUUM IS SUBJECTED TO THE EFFECTS
OF STEAM, THE PRESSURE AND TEMPERATURE OF WHICH ARE
SELECTED IN SUCH A WAY THAT THE DRYNESS OF THE STEAM
WOULD BE LESS THAN ONE; THAT AMMONIA IS ADDED TO
STEAM IN THE AMOUNT OF 0.1 TO 50 GRAMS PER KILOGRAM
OF STEAM; THAT OZONE IS ADDED TO STEAM IN THE AMOUNT
OF 0.01 TO 10 GRAMS PER KILOGRAM OF STEAM; AND THAT
AT LEAST ONE ORGANIC AMINE IS ADDED TO STEAM IN THE
AMOUNT OF 0.1 TO 50 GRAMS PER KILOGRAM OF STEAM.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-739 395

11/6

OHIO STATE UNIV COLUMBUS DEPT OF METALLURGICAL
ENGINEERING

FUNDAMENTAL STUDIES OF DISSOLUTION AND
PASSIVITY OF ALLOYS AND COMPOUNDS.

(U)

DESCRIPTIVE NOTE: REPT. FOR 1 MAR 70-28 FEB 71,

FEB 71 85P SATEHNE, R. W. ;

CONTRACT: N00014-67-A-0232-0006

PROJ: NR-036-085

UNCLASSIFIED REPORT

DESCRIPTORS: (*CORROSION, ANODIC COATINGS),
(*ANODIC COATINGS, SOLUBILITY),
(*ELECTROCHEMISTRY, ANODIC COATINGS),
THERMODYNAMICS, CORROSION INHIBITION, STABILITY,
OXIDES, IRON COMPOUNDS, CHROMIUM COMPOUNDS,
PHASE STUDIES, ALLOYS, REACTION KINETICS, IRON
OXIDES, NICKEL COMPOUNDS

(U)

IDENTIFIERS: DISSOLVING, CHROMIUM OXIDES, NICKEL
OXIDES

(U)

THE WORK IS CONCERNED WITH THE DISSOLUTION BEHAVIOR
OF THREE MATERIALS IN AQUEOUS SOLUTIONS: METALLIC
OXIDES, IRON BASE COMPOUNDS, AND METAL ALLOYS.

DURING THE FIRST YEAR, THE SIGNIFICANT LITERATURE
WAS REVIEWED FOR THE DISSOLUTION OF THE OXIDES AND
IRON BASE COMPOUNDS. A SERIES OF EXPLORATORY
STUDIES ON THE DISSOLUTION AND OXIDES WAS ALSO
COMPLETED. A BRIEF STUDY OF TUBERCLE FORMATION WAS
CONDUCTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-744 605

7/4

OTTAWA UNIV (ONTARIO) DEPT OF CHEMISTRY

ELECTROCHEMISTRY OF THE NICKEL-OXIDE
ELECTRODE. V. SELF-PASSIVATION EFFECTS IN
OXYGEN-EVOLUTION KINETICS,

(U)

MAR 68 18P CONWAY, B. E. ; SATTAR, M.
A. ; GILROY, D. ;

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ELECTROCHIMICA ACTA, V14
P677-694 1969.

SUPPLEMENTARY NOTE: SPONSORED IN PART BY ARMY ENGINEER
RESEARCH AND DEVELOPMENT LABS., FORT BELVOIR,
VA. SEE ALSO AD-742 879.

DESCRIPTORS: (*NICKEL, *ELECTROCHEMISTRY),
(*ANODIC COATINGS, NICKEL), OXIDES, NICKEL
COMPOUNDS, REACTION KINETICS, OXIDATION,
ELECTRODES, HYDROXIDES, ALKALINE CELLS,
CANADA

(U)

IDENTIFIERS: PASSIVITY, NICKEL OXIDES

(U)

POTENTIOSTATIC STUDIES ON THE OXYGEN-EVOLUTION
REACTION AT NICKEL AND OXIDIZED NICKEL SURFACES
REVEAL INHIBITION EFFECTS (SELF-PASSIVATION)
ANALOGOUS TO THOSE FOUND IN ANODIC ORGANIC OXIDATIONS
AT THE NOBLE METALS. HERE, HOWEVER, THE INHIBITING
SPECIES, SURFACE OXIDES, ARE DIRECTLY INVOLVED IN THE
OVER-ALL REACTION ITSELF. SIMILAR EFFECTS ARE
SHOWN TO ARISE AT PLATINUM IN ALKALINE SOLUTIONS AND
COMPARATIVE EXPERIMENTS ARE ALSO REPORTED FOR SILVER,
WHERE EASILY DISTINGUISHABLE STATES OF SURFACE
OXIDATION CAN BE RELATED TO THE OXYGEN-EVOLUTION
KINETICS AT OXIDIZED SILVER SURFACES. A KINETIC
THEORY OF THE SELF-INHIBITION EFFECTS IS PRESENTED IN
GENERAL TERMS FOR VARIOUS SUPPOSED OXIDATION STATES
OF THE SURFACE REGION OF THE ELECTRODE INTERPHASE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-746 003 13/8 9/1
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF
ENGINEERING

MULTI-WAFER PLASMA ANODIZATION.

(U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 72 71P ORCUTT, WILLIAM B. I
REPT. NO. GGC/EE/72-12

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, PLASMA MEDIUM),
(*SEMICONDUCTORS, ANODIC COATINGS), OXIDES,
TANTALUM COMPOUNDS, CRYSTAL GROWTH, GAS
DISCHARGES, SURFACE PROPERTIES, THESES
IDENTIFIERS: *PLASMA ANODIZATION

(U)

(U)

A PROTOTYPE MULTI-WAFER PLASMA ANODIZATION APPARATUS WAS DESIGNED AND CONSTRUCTED TO INVESTIGATE THE MULTI-WAFER PROCESS. THE APPARATUS USES A HOT HOLLOW CATHODE TO GENERATE A DENSE DISCHARGE CAPABLE OF YIELDING HIGH OXIDE GROWTH RATES. THE SAMPLES ARE PLACED PARALLEL TO THE AXIS OF THE DISCHARGE IN ORDER TO STUDY THE EFFECTS ON OXIDE GROWTH AND QUALITY OF SAMPLE POSITION WITH RESPECT TO DISCHARGE REGIONS. PLASMA AND ANODIZATION PARAMETERS WERE VARIED TO STUDY THE EFFECT ON OXIDE GROWTH RATES. THE QUALITY OF THE TANTALUM OXIDE SAMPLES WAS DETERMINED BY VISUAL AND MICROSCOPIC INSPECTION OF SURFACES AND BY PLOTTING CAPACITANCE AND DISSIPATION FACTOR PROFILES. RESULTS INDICATE THAT THE MULTI-WAFER PROCESS IS FEASIBLE AND THAT SAMPLES SHOULD BE PLACED IN THE POSITIVE COLUMN OF THE DISCHARGE NEAR THE ANODE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-749 598 14/2 13/8
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASS

CONTROLLED SECTIONING TECHNIQUE FOR SMALL
GALLIUM ARSENIDE SAMPLES,

(U)

MAY 72 4P HAGEE, T. J. ICOPER, J. J.

REPT. NO. AFCRL-72-0546
PROJ: AF-5620
TASK: 562001

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN REVIEW OF SCIENTIFIC
INSTRUMENTS, V43 N8 P1218-1220 AUG 72.

DESCRIPTORS: (*GALLIUM ARSENIDES, ANODIC
COATINGS), (*SEMICONDUCTOR DEVICES, MANUFACTURING
METHODS), OXIDATION, SURFACE PROPERTIES, TEST
METHODS, TEST EQUIPMENT

(U)

A TECHNIQUE HAS BEEN DEVELOPED FOR SECTIONING SMALL
GALLIUM ARSENIDE SAMPLES USING ANODIC OXIDATION AND
SUBSEQUENT REMOVAL OF THE OXIDE LAYERS. IT DIFFERS
FROM THOSE PREVIOUSLY REPORTED IN THAT ONLY ONE
SURFACE OF THE WAFER IS EXPOSED DURING ANODIZATION
AND TOTAL IMMERSION IN THE ELECTROLYTE IS NOT
REQUIRED. THE USE OF AN AMMONIUM PENTABORATE
SOLUTION AS THE ELECTROLYTE AND A RELATIVELY SIMPLE
ANODIZATION APPARATUS HAS YIELDED OXIDE LAYERS OF
UNIFORM THICKNESS ON THE SURFACES OF GALLIUM
ARSENIDE WAFERS. AFTER REMOVING THE OXIDE LAYERS,
THE SURFACES OF THE WAFERS WERE FOUND TO BE
RELATIVELY FREE OF PITTING AND MACROSCOPIC DEFECTS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-750 286 11/6 7/4
OHIO STATE UNIV COLUMBUS DEPT OF METALLURGICAL
ENGINEERING

FUNDAMENTAL STUDIES OF DISSOLUTION AND
PASSIVITY OF ALLOYS AND COMPOUNDS.

(U)

DESCRIPTIVE NOTE: REPT. FOR 1 MAR 71-28 FEB 72,
FEB 72 73P STAEHLE, R. W. ;
CONTRACT: N00014-67-A-0232-0006
PROJ: NR-036-085

UNCLASSIFIED REPORT

DESCRIPTORS: (*CORROSION INHIBITION, *BARRIER
COATINGS), (*ANODIC COATINGS, SOLUBILITY),
(*STAINLESS STEEL, CORROSION INHIBITION),
SOLUTIONS, THICKNESS, SULFATES, NITRATES,
PHOSPHATES, MOLYBDATES, TUNGSTATES, CARBONATES,
PH

(U)

IDENTIFIERS: PASSIVITY, DISSOLVING, STEEL 304,
ELLIPSOmetry

(U)

STUDIES ARE REPORTED ON THE DISSOLUTION OF
PROTECTIVE FILMS AND ON THE TRANSIENT DISSOLUTION
BEHAVIOR OF FE-CR-NI ALLOYS. THE PROPERTIES
OF PASSIVE FILMS WERE STUDIED USING AN OPTICAL
ELLIPSOmeter TOGETHER WITH SIMULTANEOUS COULOMETRIC
MEASUREMENTS. IT WAS POSSIBLE TO MEASURE FILM
GROWTH AND DISSOLUTION PROCESSES SIMULTANEOUSLY.
THE DISSOLUTION OF BULK OXIDES WAS ALSO STUDIED IN
ACID AND CAUSTIC SOLUTIONS TO ASSESS EFFECTS OF
ANIONS AND CATIONS. FINALLY, TRANSIENT DISSOLUTION
AND REPASSIVATION WAS STUDIED USING TRANSIENTLY
STRAINED ELECTRODES HELD AT CONSTANT POTENTIAL.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-750 410 11/6
CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND
APPLIED SCIENCE

THE PROPERTIES OF RARE EARTH METALS AND
ALLOYS.

(U)

DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. 1 MAR-31
JUL 72,

SEP 72 20P DOUGLAS, D. L. IKUENZLY, J.

D. I

REPT. NO. UCLA-ENG-7283

CONTRACT: DAMCIS-70-G-15, APRA ORDER-1643

UNCLASSIFIED REPORT

DESCRIPTORS: (*NICKEL ALLOYS, *CORROSION
RESISTANCE), (*ANODIC COATINGS, NICKEL ALLOYS),
ADDITIVES, HEAT-RESISTANT METALS + ALLOYS,
OXIDATION, REACTION KINETICS, X-RAY DIFFRACTION
ANALYSIS, RARE EARTH ELEMENTS, ALUMINA, YTTRIUM,
OXIDES, ALUMINUM ALLOYS, SCALE, SPALLATION
IDENTIFIERS: *RARE EARTH CONTAINING ALLOYS

(U)

(U)

THE HIGH-TEMPERATURE OXIDATION BEHAVIOR OF
NIAL (NI-13 W/O AL) WITH AND WITHOUT
ADDITIONS OF 0.5% YTTRIUM HAS BEEN STUDIED OVER THE
RANGE OF 900 TO 1200C IN AIR. NONE OF THE
COMMONLY ACCEPTED RATE LAWS WERE FOLLOWED BY THE
KINETICS. ALTHOUGH THE WEIGHT GAINS OF SAMPLES
CONTAINING YTTRIUM WERE CONSISTENTLY 10 TO 20%
GREATER THAN THOSE WITHOUT YTTRIUM, THE STEADY-STATE
SCALING RATES WERE IDENTICAL. A QUANTITATIVE X-
RAY DIFFRACTION TECHNIQUE WAS USED TO DETERMINE THE
KINETICS OF GROWTH OF THE PROTECTIVE ALPHA-AL2O3
LAYER (ONE OF SEVERAL OXIDES FORMED). THE
ALUMINA GROWTH FOLLOWED THE PARABOLIC RATE LAW UNDER
ALL CONDITIONS STUDIED. THE PRESENCE OF YTTRIUM
GREATLY INCREASED THE SHORT-TIME SCALE ADHERENCE.
AT LONGER TIMES, HOWEVER, THE OUTER LAYER OF
NIAL2O4 AND UNREACTED NIO SPALLED OFF ALONG
WITH SOME OF THE INNER AL2O3 LAYER. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-750 896 11/6 11/3 13/11
NAVAL INTELLIGENCE SUPPORT CENTER WASHINGTON D C
TRANSLATION SERVICES DIV

FIZIKO-KHIMICHESKAYA MEKHANIKA MATERIALOV,
NUMBER 7, 1971. (SELECTED TRANSLATIONS).
SOVIET MATERIALS SCIENCE. (U)

SEP 72 20P
REPT. NO. NISC-TRANS-3343

UNCLASSIFIED REPORT

AVAILABILITY: AVAILABLE IN MICROFICHE ONLY.
SUPPLEMENTARY NOTE: TRANS. OF FIZIKO-KHIMICHESKAYA
MEKHANIKA MATERIALOV, N7 P10-15, 18-21, 87-91 1971.

DESCRIPTORS: (*STEEL, *BARRIER COATINGS),
(*PIPES, CORROSION RESISTANCE), (*STRESS
CORROSION, CRACK PROPAGATION), (*ALUMINUM,
ANODIC COATINGS), (*TITANIUM ALLOYS,
FATIGUE(MECHANICS)), ALUMINUM COATINGS,
NICKEL, HARDENING, FAILURE(MECHANICS),
STRESSES, SHEETS, USSR (U)
IDENTIFIERS: *DRILL PIPE, *ELECTROMECHANICAL
HARDENING, THERMOMECHANICAL TREATMENT,
TRANSLATIONS (U)

CONTENTS: EFFECT OF THE BARRIER LAYER ON
CERTAIN PROPERTIES OF ALUMINIZED MEDIUM CARBON STEEL;
EFFECT OF ELECTROMECHANICAL HARDENING ON RESISTANCE
OF DRILL PIPES TO CORROSION FATIGUE FAILURE;
CORROSION-CRACK TRAJECTORY IN BIAXIAL PLANE STATE
OF STRESS; EFFECT OF ANODIZING ON FATIGUE LIMIT AND
CORROSION-FATIGUE STRENGTH OF DURALUMINUM SHEETS WITH
STRESS CONCENTRATORS; EFFECT OF STRUCTURE ON
FATIGUE STRENGTH OF CERTAIN TITANIUM ALLOYS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-751 203 11/3 7/4
TEXAS UNIV AUSTIN ELECTRONICS RESEARCH CENTER

LOW TEMPERATURE METAL OXIDE DEPOSITION BY
ALKOXIDE HYDROLYSIS;

(U)

72 20P SLADEK, KARL J. GIBERT, W.
WAYNE I
CONTRACT: F44620-71-C-0091
PROJ: AF-4751
MONITOR: AFOSR TR-72-2091

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN PROCEEDINGS OF THE
INTERNATIONAL CONFERENCE ON CHEMICAL VAPOR
DEPOSITION (3RD), SALT LAKE CITY, UTAH, 24-27
APR 72 P215-231 1972.

DESCRIPTORS: (*ANODIC COATINGS, DEPOSITION),
(*OXIDES, DEPOSITION), (*METALORGANIC COMPOUNDS,
*HYDROLYSIS), (*DIELECTRIC FILMS, DEPOSITION),
RESISTANCE(ELECTRICAL), ANNEALING, REFRACTIVE
INDEX, ALUMINA, NIOBIUM COMPOUNDS, ANTIMONY
COMPOUNDS, TITANIUM COMPOUNDS, ZIRCONIUM OXIDES,
REACTION KINETICS

(U)

IDENTIFIERS: *ALCOHOLATES, *CHEMICAL VAPOR
DEPOSITION, VAPOR DEPOSITION, *OXIDE COATINGS,
NIOBIUM OXIDES, ANTIMONY OXIDES, TITANIUM
DIOXIDE

(U)

ALKOXIDES, MR_2O_n , WHERE M = METAL AND R =
ALKYL, REACT READILY WITH WATER IN ORGANIC SOLVENTS.
THIS GENERAL REACTION WAS TRANSLATED INTO THE VAPOR
PHASE TO PRODUCE A FAMILY OF METAL OXIDE CVD
REACTIONS. WATER AND ALKOXIDE VAPORS IN N_2 WERE
PASSED OVER A SUBSTRATE IN AN ISOTHERMAL RECTANGULAR
REACTOR. FILMS OF Al_2O_3 , Nb_2O_5 , Sr_2O_3 ,
 TiO_2 , AND ZrO_2 WERE OBTAINED AT 25 -130C.
FILMS OF VO_x AND BO_x WERE OBTAINED BUT WERE NOT
TESTED FURTHER. ALL FILMS WERE AMORPHOUS AS GROWN,
BUT AIR ANNEALING AT 350 -1000C CAUSED
CRYSTALLIZATION, THICK -- SHRINKAGE, AND INCREASE IN
REFRACTIVE INDEX. RESIST. PROPERTIES AND BREAKDOWN
VOLTAGES WERE FOUND. WITH EXCEPTION OF Al_2O_3
GROWTH RATES AGREED WITH A QUANTITATIVE MODEL OF
DIFFUSION LIMITED SURFACE REACTION.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-752 907 11/3
COATING AND CHEMICAL LAB ABERDEEN PROVING GROUND MD

SEVEN YEARS TROPICAL EXPOSURE OF FINISHING
SYSTEMS FOR ALUMINUM AND MAGNESIUM.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
NOV 72 52P SANDLER, MELVIN H. ;
REPT. NO. CCL-319
PROJ: DA-1-T-U62105-A-329

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, *CORROSION INHIBITION),
(*ALUMINUM ALLOYS, CORROSION INHIBITION),
(*MAGNESIUM ALLOYS, CORROSION INHIBITION),
TROPICAL TESTS, CLEANING, ANODIC COATINGS, PAINT
PRIMERS, PLASTIC COATINGS, PROTECTIVE TREATMENTS
IDENTIFIERS: ALUMINUM ALLOY 2024, MAGNESIUM ALLOY
AZ31, PROTECTIVE COATINGS

(U)

(U)

THE REPORT COVERS A STUDY OF THE CORROSION
RESISTANCE PROVIDED BY SPECIFICATION FINISHING
SYSTEMS TO ALUMINUM AND MAGNESIUM EXPOSED IN A
TROPICAL ENVIRONMENT. THE SYSTEMS INCLUDE CHEMICAL,
ANODIC, AND WASH PRIMER METAL PRETREATMENTS; PRIMERS
SPECIFIED FOR THESE METALS IN MILITARY STANDARD
NO. 171 'FINISHING OF METAL AND WOOD
SURFACES'; SEVERAL OTHER SPECIFICATION PRIMERS THAT
HAVE BEEN USED FOR THESE METALS; AND AN EXPERIMENTAL
EPOXY PRIMER. FINISH COATS INCLUDED SPECIFICATION
LUSTRELESS, SEMI-GLOSS, AND GLOSS ALKYD RESIN ENAMELS
AND A GLOSS POLYAMIDE-EPOXY ENAMEL. SEVEN YEARS
EXPOSURE, SHOWS FINISHING SYSTEMS ARE AVAILABLE FOR
THE PROTECTION OF ALUMINUM AND MAGNESIUM.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-756 472 11/3 774
MCMASTER UNIV HAMILTON (ONTARIO) INST FOR MATERIALS
RESEARCH

A RADIOCHEMICAL TECHNIQUE FOR DETERMINING
DEPTH DISTRIBUTIONS IN MO,

(U)

OCT 71 6P ARORA, M. R. ; KELLY, ROGER ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE
ELECTROCHEMICAL SOCIETY, V119 N2 P270-274 FEB 72.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 30 JUL
71.

DESCRIPTORS: (*OXIDES, *ION BOMBARDMENT),
(*ANODIC COATINGS, *THICKNESS), (*ION
BOMBARDMENT, THICKNESS), MEASUREMENT, KRYPTON,
RADIOCHEMISTRY, CALIBRATION, ELECTROCHEMISTRY,
CANADA

(U)

IDENTIFIERS: *MOLYBDENUM OXIDES

(U)

MOLYBDENUM CAN BE ANODIZED AT UP TO 235V IN AN
ELECTROLYTE CONTAINING GLACIAL ACETIC ACID,
NA2B4O7.10 H2O, AND WATER. THE RESULTING
OXIDE FILMS, WHICH MUST BE STABILIZED BY COMPRESSED-
AIR DRYING, SHOW BRILLIANT INTERFERENCE COLORS, HAVE
A LINEAR (OR NEARLY LINEAR) THICKNESS-VOLTAGE
RELATION, AND CAN BE FORMED WITH THICKNESSES OF UP TO
380 MICROGRAM/SQ CM OF OXIDE. WHEN EXPOSED TO 1.0
G/LITTER AQUEOUS KOH, THE FILMS DISSOLVE
(STRIP) WITHIN 30 SEC, WHEREAS THE UNDERLYING
METAL DISSOLVES AT A RATE OF ONLY 20 A/HR. THE
FILM THICKNESSES FORMED ON MO WHICH HAS BEEN
SUBJECTED TO KR ION BOMBARDMENT ARE SIMILAR TO
THOSE ON UNBOMBARDED SPECIMENS. IT FOLLOWS FROM
THESE RESULTS THAT THE USE OF AN ANODIZING-STRIPPING
SEQUENCE FOR DETERMINING DEPTH DISTRIBUTIONS IN MO
SHOULD BE POSSIBLE. EXAMPLES OF DEPTH DISTRIBUTIONS
FOR 10-KEV KR ARE GIVEN AND ARE SHOWN, BY
COMPARISON BOTH WITH THEORY AND WITH PREVIOUSLY
OBTAINED RESULTS FOR W, TO BE NUMERICALLY
PLAUSIBLE. (AUTHOR MODIFIED ABSTRACT)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON04

AD-760 171 11/3
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL
ENGINEERING

PLASMA ANODIZATION. (U)

DESCRIPTIVE NOTE: FINAL REPT. 21 JUN 71-20 JUN 72,
NOV 72 SOP PULFREY, DAVID L. YOUNG,
LAWRENCE HOLIVE, GRAHAM;
CONTRACT: F33615-71-C-1886
MONITOR: AFAL TR-72-362

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED MAR 71, AD-
722 490.

DESCRIPTORS: (*ANODIC COATINGS, PLASMA MEDIUM),
(*DIELECTRIC FILMS, PLASMA MEDIUM), TANTALUM,
NIOBIUM, SILICON DIOXIDE, THIN FILM STORAGE
DEVICES, CANADA (U)
IDENTIFIERS: *ANODIZING, THIN FILMS, METAL OXIDE
SEMICONDUCTORS, SEMICONDUCTOR COMPUTER STORAGE (U)

THE PROCESS OF PLASMA ANODIZATION HAS BEEN
INVESTIGATED USING TWO SYSTEMS. THE FIRST WAS A
COLD CATHODE DC DISCHARGE SYSTEM (REPLACING
APPARATUS DESCRIBED IN OUR EARLIER REPORTS) WITH
AUTOMATED ELLIPSOMETRY TO CONTINUOUSLY FOLLOW THE
GROWTH OF THE OXIDE. THE SECOND SYSTEM EMPLOYED AN
R.F. DISCHARGE WITH GROWTH OF THE OXIDE BEING
FOLLOWED BY MONITORING THE INTENSITY REFLECTIVITY OF
S-LIGHT FROM A HE/NE LASER. EXPERIMENTS ARE
DESCRIBED WHICH INDICATE THAT NEGATIVE OXYGEN IONS
FORM THE PLASMA ARE NOT DIRECTLY INVOLVED IN THE
GROWTH OF OXIDES ON TANTALUM IN A D.C. DISCHARGE.
ALSO REPORTED ARE DATA ON THE THICKNESS-AND
TEMPERATURE-DEPENDENCE OF THE RELATION BETWEEN OXIDE
FIELD AND OXIDE GROWTH RATE FOR THE CASE OF SI
ANODIZATION IN AN R.F. DISCHARGE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-762 995. 11/3
ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB

ELECTRON MICROSCOPE STUDY OF BREAKDOWN AND
REPAIR OF ANODIC FILMS ON ALUMINUM, (U)

JUN 72 9P ZAHAVI, J. METZGER, M. I
CONTRACT: DA-ARO-D-31-124-72-G28
PROJ: DA-2-0-061102-B-32-D
MONITOR: AROD 5063:3-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF THE
ELECTROCHEMICAL SOCIETY, V119 N11 P1479-1485 NOV 72.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 12 AUG 71.
SPONSORED IN PART BY ATOMIC ENERGY COMMISSION,
WASHINGTON, D. C. AND THE ADVANCED RESEARCH
PROJECTS AGENCY, ARLINGTON, VA.

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM),
ELECTRON MICROSCOPY, INTERFACES, SURFACE
PROPERTIES, STABILITY (U)
IDENTIFIERS: THIN FILMS, SURFACE CHEMISTRY (U)

IN FILMS FORMING IN 2.4M H2SO4, AT 5 MA/CM
SQ, MANY BREAKDOWN EVENTS INCLUDING PIT INITIATION
WERE FOUND TO OCCUR CONTINUALLY BUT TO BE FOLLOWED BY
ALMOST IMMEDIATE REPAIR, SO THAT THE STABILITY OF
FILM GROWTH WAS DUE NOT TO THE ABSENCE OF BREAKDOWN
BUT TO THE EFFICACY OF REPAIR. A RELATION BETWEEN
THE SITES OF BREAKDOWN AND SUBSTRATE STRUCTURE WAS
NOT INDICATED. FILM GROWTH WAS INTERPRETED AS
OCCURRING THROUGH A COMPACT FILM AT PORE BASES, AS IN
THE CLASSICAL MECHANISM, AND ALSO THROUGH BREAKDOWN -
EXTENSION OF A PORE NEAR TO THE METAL INTERFACE - AND
REPAIR BY REANODIZATION TO FORM A HEMISPHERE OF
COMPACT FILM EXTENDING INTO THE SUBSTRATE. AN
INTERPRETATION OF THE GEOMETRICAL STRUCTURE OF THE
FILM IS PROPOSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-764 253 10/3
ESB INC YARDLEY PA

MAGNESIUM FILM STUDY.

(U)

DESCRIPTIVE NOTE: SEMIANNUAL REPT. NO. 1, 15 MAY-15
NOV 72,

JUL 73 127P BUTLER, W. O. DAFLER, J.

R. DOE, J. B. HULL, M. H. I

CONTRACT: DAAB07-72-C-0184

PROJ: 1-T-662705-A-053

TASK: 1-T-662705-A-05302

MONITOR: ECOM 0184-S-72

UNCLASSIFIED REPORT

DESCRIPTORS: (*DRY CELLS, *ANODIC COATINGS),
(*MAGNESIUM, DRY CELLS), HYDROXIDES, MAGNESIUM
OXIDES, FILMS, CORROSION, PRIMARY CELLS, SURFACE
PROPERTIES, CHROMATES,
RELIABILITY(ELECTRONICS)

(U)

IDENTIFIERS: *MAGNESIUM CELLS, MAGNESIUM
HYDROXIDES

(U)

THE REPORT DISCUSSES A STUDY OF THE STRUCTURE AND
COMPOSITION OF THE VARIOUS FILMS THAT ARE FORMED ON
THE MAGNESIUM DRY CELL ANODE PRIOR TO AND DURING
STORAGE, AND DURING DISCHARGE, FOR THE PURPOSE OF
ELIMINATING OR REDUCING THE DELAYED ACTION AND THE
UNPRODUCTIVE CORROSION ENCOUNTERED IN THE MAGNESIUM
DRY CELL. SPECIAL EMPHASIS IS PLACED UPON
CORRELATION OF TEST DATA WITH APPLICABLE DRY CELL
PARAMETERS. (MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-767 001 7/4
FRANKFORD ARSENAL PHILADELPHIA PA

ANODIC ELECTROLUMINESCENCE OF ANODIC FILMS ON
ERBIUM AND HOLMIUM METALS IN SODIUM
ALUMINATE SOLUTION, (U)

MAR 73 16P GRUSS, LEONARD L. IMACKUS,
THOMAS J. ISALOMON, R. E. I
REPT. NO. FA-A73-4
PROJ: DA-1-T-061102-B-32-A

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE
SYMPOSIUM ON OXIDE-ELECTROLYTE INTERFACES, P276-287
1973.

DESCRIPTORS: (*ELECTROLUMINESCENCE, *ANODIC
COATINGS), ERBIUM, HOLMIUM, ELECTRODES,
SOLUTIONS, ELECTROCHEMISTRY, TEMPERATURE,
SPECTRA (VISIBLE + ULTRAVIOLET), ALUMINATES (U)

ANODIC ELECTROLUMINESCENCE OF ANODIC FILMS ON
ERBIUM AND HOLMIUM METALS WAS STUDIED IN SODIUM
ALUMINATE SOLUTIONS AS A FUNCTION OF TEMPERATURE AND
VOLTAGE. THE RESULTS SUGGEST THAT
ELECTROLUMINESCENCE OCCURS AT THE OXIDE-ELECTROLYTE
INTERFACE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-812 998 11/3 11/6
PHILCO-FORD CORP NEWPORT BEACH CALIF AERONUTRONIC DIV

OPTIMIZATION AND EVALUATION OF ALUMINUM SEALING. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 65-15 DEC 66,

MAR 67 84P FASSELL, W. M., JR.

CONTRACT: AF 33(615)-2747

PROJ: AF-7381

TASK: 738107

MONITOR: AFML TR-67-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLYS, *CORROSION),
(*CORROSION INHIBITION, *ANODIC COATINGS),
COLLOIDS, NICKEL COMPOUNDS, ACETATES, SODIUM
COMPOUNDS, SILICATES, AGING(MATERIALS),
CHROMATES, HEAVY WATER, ELECTROLYTES, SURFACE
PROPERTIES, FILMS, OPTIMIZATION, CORROSION-
RESISTANT ALLOYS, X-RAY DIFFRACTION ANALYSIS, SALT
SPRAY TESTS, NITROGEN OXIDES, PH, MOLYBDATES,
POLYMERS, OXIDES, SPECTRA(INFRARED), SURFACE
AREA, DIELECTRIC PROPERTIES, ELECTRON MICROSCOPY,
FATIGUE(MECHANICS) (U)
IDENTIFIERS: NITROGEN TETROXIDE, ALUMINUM ALLOY
7075, DICHROMATES, TITAN, ALUMINUM ALLOY 2024,
ALUMINUM ALLOY 7178, ALUMINUM ALLOY 7079 (U)

PRELIMINARY STUDIES SHOWED THAT OUTSTANDING
CORROSION RESISTANCE TO HUMID N2O4 AND SALT FOG
COULD BE ACHIEVED ON SULFURIC ACID ANODIZED 7075-T6
ALUMINUM ALLOYS WHEN SEALED FIRST WITH NICKEL ACETATE
FOLLOWED BY SODIUM DICHROMATE. IN THIS STUDY, THE
NICKEL ACETATE-SODIUM DICHROMATE SEALING PROCEDURE,
TERMED DUPLEX SEALING, WAS INVESTIGATED IN DETAIL FOR
2024-T3, 7075-T6, 7178-T6 AND 7079-T6
ALUMINUM ALLOYS TO IDENTIFY THE TREATMENT
COMBINATIONS GIVING OPTIMUM CORROSION RESISTANCE.
THE PROCESS VARIABLES STUDIED WERE SEAL SOLUTION
IMMERSION TIMES, TEMPERATURES AND CONCENTRATIONS.
FACTORIAL DESIGNED EXPERIMENTS WERE USED, FOLLOWED
BY STATISTICAL ANALYSES OF THE CORROSION RESISTANCE
OF THE TREATMENT COMBINATIONS. THE NICKEL ACETATE
SEAL TEMPERATURE WAS FOUND TO BE THE PREDOMINANT
VARIABLE AFFECTING CORROSION RESISTANCE. THE
LOWEST TEMPERATURE, 100 F, RESULTED IN THE BEST
CORROSION RESISTANCE.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-836 534 11/3 22/2
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

EFFECTS OF VACUUM-ULTRAVIOLET ENVIRONMENT ON OPTICAL
PROPERTIES OF BRIGHT ANODIZED ALUMINUM TEMPERATURE
CONTROL COATINGS. (U)

DESCRIPTIVE NOTE: REPT. FOR MAR-SEP 67,
MAY 68 32P WEAVER, JAMES H. ;
REPT. NO. AFML-TR-67-421
PROJ: AF-7340
TASK: 734007

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM COATINGS, *ANODIC
COATINGS), SPACECRAFT, DEGRADATION, ABSORPTION,
EMISSIVITY, OPTICAL PROPERTIES, SPACE
ENVIRONMENTAL CONDITIONS, TEMPERATURE, SOLAR
RADIATION, ULTRAVIOLET RADIATION (U)
IDENTIFIERS: ANODIZED ALUMINUM, (U)
GRAPHS(CHARTS)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-845 116

11/3

ARMY MISSILE COMMAND REDSTONE ARSENAL ALA STRUCTURES AND
MECHANICS LAB

SELF-HEALING PROTECTIVE COATINGS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

SEP 68

13P

FRUCHTNICHT, OCKE C. ; PARK,

BOOBY C. ;

REPT. NO. RS-TR-68-11

PROJ: DA-1-C-024401-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (*MAGNESIUM ALLOYS, *ANODIC
COATINGS), VANADATES, FLUORIDES, AMMONIUM
COMPOUNDS, ELECTROCHEMISTRY, SOLUTIONS, DIFFUSION
IDENTIFIERS: PROTECTIVE COATINGS

(U)

(U)

LABORATORY RESEARCH WAS CONDUCTED ON THE
DEVELOPMENT OF PROTECTIVE (SELF-HEALING) COATINGS
ON MAGNESIUM ALLOYS. GASEOUS DIFFUSION, REACTIVE
SOLUTIONS, AND ELECTROCHEMICAL METHODS OF APPLICATION
WERE INVESTIGATED. THE FIRST TWO METHODS WERE
UNSUCCESSFUL; HOWEVER, ELECTROCHEMICAL METHODS
EMPLOYING A BIFLUORIDE, META-VANADATE SOLUTION
YIELDED COATINGS OF A HIGHLY PROTECTIVE NATURE ON
MAGNESIUM AND ITS ALLOYS. (AUTHOR)

(U)

II
ANTIFOULING COATINGS

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M05

AD-257 204

CLAPP (WILLIAM F) LABS INC DUXBURY MASS

PRESERVATIVE TREATED MARINE EXPOSURE TEST PANELS,
NSIA 1953 SERIES

(U)

DESCRIPTIVE NOTE: FINAL REPT.

MAY 61 19P

REPT. NO. 11842

CONTRACT: NOBS78875

PROJ: NS-032-001

UNCLASSIFIED REPORT

AVAILABILITY: REFERENCE ONLY AFTER ORIGINAL COPIES
ARE EXHAUSTED.

DESCRIPTORS: *ANTIFOULING COATINGS, *SHIP HULLS, *WOOD;
ARSENIC COMPOUNDS, CHROMATES, COATINGS, COPPER COATINGS,
COPPER COMPOUNDS, EFFECTIVENESS, FUNGUSPROOFING,
INSECTICIDES, MARINE BORERS, MOISTUREPROOFING, PAINTS,
PRESERVATION, SHIPS, TEST METHODS, TESTS (U)

A SERIES OF MARINE EXPOSURE TEST PANELS WERE
DEvised TO STUDY PRESERVATIVE RETENTION AND
EFFECTIVENESS OF COPPER-TREATED WOODEN HULLS. A
NUMBER OF SPECIMENS WERE PAINTED WITH NAVY
FORMULATIONS 16K AND VINYL ANTIFOULING PAINT
FORMULA 121. CELCURE (ACID COPPER CHROMATE),
CHEMONITE (AMMONIACAL COPPER ARSENITE), AND
GREENSALT (CHROMATED COPPER ARSENATE), WERE
SUPERIOR TO COPPERIZED CHROMATED ZINC
CHLORIDE AND COPPER NAPHTHANATE. THE 16X
AND 121 PAINT FORMULATIONS WERE COMPATIBLE WITH THE
TREATMENTS! THE 16X FORMULATION WAS EFFECTIVE FOR 2
YEARS, WHILE THE 121 FORMULATION WAS EFFECTIVE FOR 3
YEARS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-264 367

MIAMI UNIV FLA MARINE LAB

ANTI FOULING POTENTIALS OF PESTICIDAL MATERIALS (U)

MAR 61 IV

REPT. NO. 61070

CONTRACT: NOA559 6182

UNCLASSIFIED REPORT

DESCRIPTORS: *ANTI FOULING COATINGS, *FUNGUS PROOFING,
*GERMICIDES, *MARINE BIOLOGY, *PESTICIDES, *POROUS
MATERIALS, ALGAE, AQUATIC ANIMALS, BARNACLES, COATINGS,
DIFFUSION, EFFECTIVENESS, FOULING, INSTALLATION, MARINE
BORERS, METAL ORGANIC COMPOUNDS, ORGANIC COATINGS,
ORGANIC COMPOUNDS, PAINTS, SEA WATER, TEST EQUIPMENT,
TEST METHODS, TROPICAL DETERIORATION (U)

RESULTS OF INVESTIGATIONS CONDUCTED BY THE
MARINE LABORATORY DURING THE PERIOD MAY 1, 1959
THROUGH JUNE 30, 1960, CONCERNING THE ANTI FOULING
POTENTIALS OF PESTICIDAL MATERIALS ARE PRESENTED.
THE ULTIMATE OBJECTIVE OF THIS PROGRAM WAS TO
SELECT CHEMICALS WHICH USED SINGLY OR IN ASSOCIATION
WITH OTHER CHEMICALS WOULD OFFER COMPLETE PROTECTION
AGAINST THE ENTIRE SPECTRUM OF FOULING ORGANISMS
USUALLY FOUND IN TROPICAL WATERS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-278 356

NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

PROTECTIVE COATINGS FOR STEEL PILING: RESULTS OF 30-
MONTH TESTS (U)

JUN 62 52P ALUMBAUGH, R.L.;
REPT. NO. NCEL-YR-194
PROJ: Y-R007-08-401

UNCLASSIFIED REPORT

DESCRIPTORS: ABRASIVES, ALUMINUM COATINGS, ANTIFOULING
COATINGS, APPROACH LIGHTS, ASPHALT, COANDA EFFECT,
CORROSION INHIBITION, DEGRADATION, PHENOLIC PLASTICS,
PLASTICS, SEA WATER, STEEL, STRUCTURES, SYNTHETIC
RUBBER, UNDERWATER, VARNISHES, VINYL RADICAL, ZINC
COATINGS (U)

EIGHT COATING SYSTEMS WERE EVALUATED AS PROTECTIVE COATING
SYSTEMS FOR STEEL PILES. COATED SHEET AND H PILES WERE
DRIVEN IN THE SURF AT PORT HUENEME AND EXPOSED 12 TO 30
MONTHS. A VINYL MASTIC COATING WAS THE MOST ECONOMICAL
PROTECTION.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: /ZOM05

AD-281 865

PUGET SOUND NAVAL SHIPYARD BREHERTON WASH MATERIAL
LABS

REINFORCED PLASTIC COATINGS FOR THE PROTECTION OF
STEEL SURFACES.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT.:

JUN 62 36P PHELPS, H. E. I

REPT. NO. P 300 13

UNCLASSIFIED REPORT

DESCRIPTORS: *ANTIFOULING COATINGS, *PLASTIC COATINGS,
CORROSION, DEGRADATION, EFFECTIVENESS, METAL PLATES,
PLASTICS, SEA WATER, STEEL, SURFACES

(U)

ANTIFOULING PAINTS APPLIED OVER PLASTIC COATED MILD
STEEL PANELS HAVE BEEN EXPOSED TO EITHER FULL OR PART
TIME SALTWATER IMMERSION FOR APPROXIMATELY FIVE
YEARS. THE EFFECTIVENESS OF THE ANTIFOULING PAINTS
AND THE PLASTIC SUBCOATS IS EVALUATED. (AUTHOR)

(M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-281 866

PUGET SOUND NAVAL SHIPYARD BREMERTON WASH MATERIAL
LABS

REINFORCED PLASTIC COATINGS FOR THE PROTECTION OF
STEEL SURFACES.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

JUN 62 39P PHELPS, M. E. ;

REPT. NO. P 300 14

UNCLASSIFIED REPORT

DESCRIPTORS: *ANTIFOULING COATINGS, *PLASTIC COATINGS,
ATMOSPHERE, CORROSION, DEGRADATION, EFFECTIVENESS, METAL
PLATES, PLASTICS, SEA WATER, STEEL, SURFACES (U)

PLASTIC COVERED MILD STEEL PANELS COATED WITH
EITHER BOOTTOP OR TOPSIDE PAINTS HAVE BEEN EXPOSED TO
EITHER PART TIME SALT WATER IMMERSION OR ATMOSPHERIC
CONDITIONS FOR FIVE YEARS. THE EFFECTIVENESS OF
THE PAINTS AND THE UNDERLYING PLASTICS IS EVALUATED.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-290 716

FOREST PRODUCTS LAB MADISON WIS

PRESENT STATUS OF RESULTS-TYPE SPECIFICATIONS FOR
TREATED WOOD

(U)

NOV 62 IV BAECHLER, R.H. I
REPT. NO. 2260

UNCLASSIFIED REPORT

DESCRIPTORS: *ACTINIUM, *ANTIFOULING COATINGS, *WOOD,
COATINGS, CREOSOTE, DEGRADATION, GRILLES, PHENOLS,
PRESERVATION, PROCESSING, TEST METHODS

(U)

RESULTS-TYPE SPECIFICATIONS FOR TREATED WOOD. RELIABILITY
AND STANDARDIZATION OF PRESERVATIVE RETENTION ASSAYS FOR
POLES, PILING AND LUMBER. INSPECTIONS AT TREATING PLANT
AND/OR AT DESTINATION. ASSAY OF BORINGS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-412 769

NAVAL APPLIED SCIENCE LAB BROOKLYN N Y

PATROL CRAFT (HYDROFOIL), PCH-1.

(U)

AUG 63 5P

REPT. NO. NASL-4759-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, CORROSION INHIBITION),
(*CAVITATION, EROSION), (*ANTIFOULING COATINGS,
PAINTS), FOILS, FLAPS, MARINE RUDDERS, PRO
TECTIVE TREATMENTS, HALOCARBON PLASTICS.
IDENTIFIERS: 1963, POLYISOBUTYLENE, NEOPRENE.

(U)

(U)

CAVITATION EROSION RESISTANT COATINGS WERE APPLIED
TO FOILS, STRUTS, FLAPS AND RUDDERS. CONDITION
AFTER STATIC IMMERSION FOR FOUR MONTH PERIOD WAS
OBSERVED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-600 397

CLAPP (WILLIAM F) LABS INC DUXBURY MASS

THAMES 'CELPLY' PANELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.

MAR 64 5P

REPT. NO. WFCL12813

CONTRACT: NOBS90044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLYWOOD, PROTECTIVE TREATMENTS),
(*ANTIFOULING COATINGS, LIQUID IMMERSION TESTS),
PROTECTIVE TREATMENTS, IMPREGNATION, MARINE BORERS,
LIQUID IMMERSION TESTS, SEA WATER, LIFE EXPECTANCY,
PRESERVATION
IDENTIFIERS: CELCURE

(U)
(U)

THE RESULTS OF SEA WATER IMMERSION TESTS INDICATE THAT: THE CELCURE-TREATED MAHOGANY PLYWOOD KNOWN AS THAMESCELPLY WAS SUFFICIENTLY RESISTANT TO MARINE BORER ATTACK TO MERIT FURTHER CONSIDERATION FOR MARINE USE, BUT THE LENGTH OF THIS TEST, 36 MONTHS, WAS NOT ENOUGH TO CONCLUSIVELY PREDICT AN EXTENDED LIFE FOR THIS PRODUCT. FORMULA 105 AF PAINT, BOTH ALONE AND APPLIED OVER FORMULA 117 PRETREATMENT, IS COMPATIBLE WITH THIS PRODUCT AND SHOWS A GOOD SERVICE LIFE OF AT LEAST 36 MONTHS. FORMULA 121 AF PAINT IS COMPATIBLE WITH THIS PRODUCT AND SHOWS A GOOD SERVICE LIFE OF AT LEAST 36 MONTHS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-600 399

CLAPP (WILLIAM F) LABS INC DUXBURY MASS

PARINARIUM SP. - LIBERIAN PINE-AFRICAN OAKAFRICAN
WISHMORE. (U)

DESCRIPTIVE NOTE: FINAL REPT.

FEB 64 8P

REPT. NO. WFCL-12907

CONTRACT: NOBS90044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON AFRICAN WOODS.

DESCRIPTORS: (*WOOD, ANTIFOULING COATINGS),
(*ANTIFOULING COATINGS, LIQUID IMMERSION TESTS), LIQUID
IMMERSION TESTS, SEA WATER, PRESERVATION, MARINE
BORERS (U)

AFTER SEA WATER IMMERSION TESTS ALL PANELS COATED
WITH FORMULA 121 ANTI-FOULING PAINT REMAINED INTACT
AND THE PAINT COAT REMAINED SERVICEABLE AND RETAINED
ITS ANTI-FOULING PROPERTIES FOR THE ENTIRE 33 MONTH
PERIOD. THE LIBERIAN PINE, AFRICAN OAK AND
WISHMORE PANELS COATED WITH FORMULA 105 ANTI-
FOULING PAINT REMAINED INTACT. THE PAINT COAT
ITSELF REMAINED SERVICEABLE AND RETAINED ITS ANTI-
FOULING PROPERTIES FOR THE ENTIRE 33 MONTH PERIOD.
TWO OF THE THREE PARINARIUM PANELS COATED WITH
FORMULA 105 ANTI-FOULING PAINT WERE ATTACKED BY FEW
TO SEVERAL ABORTIVE BANKIA AND A FEW SMALL
PHOLADS. ON THE PARINARIUM PANELS THE
FORMULA 105 PAINT RETAINED ITS ANTI-FOULING
PROPERTIES TO THE END OF THE TEST PERIOD BUT FAILED
AS A COATING AT 24 MONTHS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-600 415

CLAPP (WILLIAM F) LABS INC DUXBURY MASS

SOUTHERN YELLOW PINE SAPWOOD PANELS WITH COPPER
SULPHONATE. (U)

DESCRIPTIVE NOTE: FINAL REPT.

MAR 64 6P

REPT. NO. 12814

CONTRACT: NOBS90044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (WOOD, PROTECTIVE TREATMENTS),
(PROTECTIVE TREATMENTS, LIQUID IMMERSION TESTS), LIQUID
IMMERSION TESTS, SEA WATER, IMPREGNATION, COPPER
COMPOUNDS, SULFONATES, ANTIFOULING COATINGS, MARINE
BORERS, PRESERVATION (U)

THIS REPORT PRESENTS THE RESULTS OF SEAWATER
IMMERSION TESTS. AFTER SIX AND ONE-HALF YEARS
EXPOSURE, UNPAINTED PANELS TREATED WITH COPPER
SULPHONATE SHOWED REMARKABLE RESISTANCE TO MARINE
BORER ACTIVITY. THERE WERE SPASMODIC EVIDENCES OF
EMBRYONIC BANKIA AND PHOLADS, BUT NO PENETRATION.
ALL PANELS WERE IN GOOD CONDITION AT THE CONCLUSION
OF THE TEST AND THEIR PROBABLE SERVICE LIFE COULD BE
PROJECTED SEVERAL MORE YEARS. COPPER SULPHONATE
TREATED PANELS AT ALL RETENTIONS TESTED SHOWED A
DEFINITE ANTIFOULING INFLUENCE OVER A 24 MONTH
PERIOD. BECAUSE OF PEELING AND CRACKING, FAILURE OF
FORMULA 121 ANTIFOULING PAINT BEGAN AFTER A YEAR'S
EXPOSURE AND THE PAINT WAS ALL GONE BY 24 MONTHS.
THE TREATED PANEL (NOW EXPOSED UNCOATED)
EXHIBITED THE SAME ANTIFOULING PROPERTIES AS THE
ORIGINAL UNCOATED TREATED PANELS. FORMULA 105
ANTIFOULING PAINT WAS MORE SUCCESSFUL THAN THE 121
ANTIFOULING PAINT. CRACKING AND PEELING STARTED AT
A YEAR'S EXPOSURE BUT THE COATING LASTED UP TO 36
MONTHS. THERE WAS NO EVIDENCE OF MARINE BORER
ATTACK IN THE COATED PANELS AS LONG AS THE PAINT WAS
PRESENT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-628 194 11/3 14/2 13/10
DEPARTMENT OF THE NAVY WASHINGTON D C

RAPID METHODS OF TESTING ANTIFOULING PAINTS FOR
OCEAN-GOING SHIPS;

(U)

66 12P GLOTEV, V. N. IGUREVICH, E. S. I
GEINE, E. I. ;
REPT. NO. TRANSLATION-2059;
MONITOR: TT , 66-60557

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: OB USKORENNYKH METODAKH
ISPYTANIYA NEOBRASTAIUSHCHIKH KRASOK DLYA MORSKIKH
SUDOV, TRANS. OF LAKAKRASOCHNE MATERIALY I IKH
PRIMENENIE (USSR) NO P53-6 1964.

DESCRIPTORS: (*ANTIFOULING COATINGS, MODEL TESTS),
(*MODEL TESTS, ANTIFOULING COATINGS), (*TEST
METHODS, ANTIFOULING COATINGS), SHIPS, SEA WATER,
LIFE EXPECTANCY, TOXICITY, USSR

(U)

THE KINETICS OF THE PROCESS WHEREBY COPPER IONS
TOXIC FOR MARINE ORGANISMS ARE LEACHED FROM
ANTIFOULING COATINGS OF KHV-53 AND KHS-79 PAINTS
WERE STUDIED. IT WAS SHOWN THAT THIS PROCESS TAKES
PLACE AT DIFFERING TEMPERATURES, CHLORIDE
CONCENTRATIONS AND LEACHING MEDIUM PH, AND THAT IT
FOLLOWS EQUAL REGULAR PATTERNS FOR BOTH PAINTS;
TEMPERATURE, HOWEVER, IS THE MOST IMPORTANT FACTOR
DETERMINING THE LEACHING SPEED OF COPPER FROM
COATINGS. IT IS RECOMMENDED THAT A FAST METHOD OF
DETERMINING THE EFFECTIVENESS OF ANTIFOULING COATINGS
BE USED EMPLOYING A GLYCINE SOLUTION; IT IS ESSENTIAL
THAT THE SAMPLES BEING TESTED BE THERMOSTATICALLY
CONTROLLED AND ROTATED IN THE LEACHING MEDIUM. AN
IMPROVED QUICK METHOD HAS BEEN DEVELOPED FOR
DETERMINING THE LEACHING SPEED OF COPPER FROM
ANTIFOULING COATINGS IN A THERMOSTATICALLY CONTROLLED
APPARATUS. THIS METHOD IS SUITABLE FOR CHECKING
THE EFFICIENCY OF ANTIFOULING PAINTS BOTH WHEN PAINT
FORMULAS AND COATING SYSTEMS ARE BEING DEVELOPED AND
WHEN THE QUALITY OF INDUSTRIAL OUTPUT IS BEING
INSPECTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-629 863

11/3

DEPARTMENT OF THE NAVY WASHINGTON D C

USE OF ANTI-CORROSION AND ANTI-FOULING PAINTS BASED
ON COAL TAR AND ITS MIXTURES WITH PHENOL OR EPOXY
RESINS.

(U)

66

6P

IZRANYANTS, E. D. MURONTSEV,

A. K. I

REPT. NO. TRANSLATION-2057.

UNCLASSIFIED REPORT

AVAILABILITY: MICROFICHE ONLY AFTER ORIGINAL COPIES
EXHAUSTED.

SUPPLEMENTARY NOTE: PRIMENENIE ANTIKORROZIONNYKH I
NEOBRASTAIUSHCHIKH KRASOK NA OSNOV KAMENNOUGOLNOGO
PEKA ILI SMESI EGO S FENOLNYMI I EPOKSIDNYMI
SMOLAMI, TRANS. OF LAKOKRASOCHNE MATERIALY I IKH
PRIMENENIE (USSR) NS P44-6 1964.

DESCRIPTORS: (*ANTIFOULING COATINGS, TAR),
(*CORROSION INHIBITION, TAR), (*TAR,
ANTIFOULING COATINGS), COAL, MIXTURES, PHENOLS,
EPOXY PLASTICS, EFFECTIVENESS, USSR

(U)

TRANSLATION OF RUSSIAN RESEARCH: USE OF ANTI-
CORROSION AND ANTI-FOULING PAINTS BASED ON COAL TAR AND ITS
MIXTURES WITH PENOL OR EPOXY RESINS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM05

AD-686 933

11/3

CENTRAL INST OF FISHERIES TECHNOLOGY COCHIN (INDIA)

ANTIFOULING PROPERTIES OF 'EMERALD GREEN': A
PRELIMINARY OBSERVATION.

(U)

64

4P

BALASUBRAMANYAN, R. IRAYINGRAN,

K. :

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN PROCEEDINGS OF THE
SYMPOSIUM ON MARINE PAINTS, TECHNICAL SESSION
NO. 3, MARINE FOULING (PREVENTION), HELD IN NEW
DELHI (INDIA), 20-21 NOV 64, 3P. NO COPIES
FURNISHED.

DESCRIPTORS: (*ANTIFOULING COATINGS, *ARSENIC
COMPOUNDS), (*COPPER COMPOUNDS, ANTIFOULING
COATINGS), SHIPS, INDIA, TEST METHODS,
TOXICITY

(U)

IDENTIFIERS: *EMERALD GREEN-COPPER(II)
ACETOARSENITE, COPPER(III) ACETOARSENITE, ARSENIC
ORGANIC COMPOUNDS

(U)

THE PAPER DESCRIBES THE WORK CARRIED OUT ON AN
ANTIFOULING COMPOSITION INCORPORATING EMERALD
GREEN, A COPPER ARSENIC COMPOUND, AS THE TOXIC
PIGMENT. EXPOSURE TRIALS AT DIFFERENT SITES SHOWED
THE FOULING-FREE LIFE OF THE COMPOSITION TO BE 6 TO 7
MONTHS WHICH WAS HIGHER THAN THAT OF THE COMMERCIAL
COMPOSITIONS EXPOSED SIMULTANEOUSLY. EMERALD
GREEN IS REGARDED AS A SATISFACTORY TOXICANT.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

D-687 727 13/10

NAVAL SHIP SYSTEMS COMMAND WASHINGTON D C SCIENTIFIC
DOCUMENTATION DIV

ELECTROCHEMICAL PROTECTION OF SHIP HULLS
(PRIMENENIE ELEKTROKHIMICHESKOI ZASCHITY
KORPUSA SUDNA),

(U)

DEC 68 12P KAGANSKI, G. YA. I
MONITOR: NAVSHIPS TRANS-1156

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF SUDOSTROENIE (USSR) V58
N5 P58-62 1968, BY LLOYD G. ROBBINS.

DESCRIPTORS: (*SHIP HULLS, *PROTECTIVE
TREATMENTS), (*ELECTROCHEMISTRY, PROTECTIVE
TREATMENTS), MARINE ENGINEERING, SHIPS,
CORROSION, FOULING, CORROSION INHIBITION,
COATINGS, ANTIFOULING COATINGS, PAINTS,
VARNISHES, ZINC COMPOUNDS, CORROSION-RESISTANT
ALLOYS, SHIELDING, SHIPYARDS, USSR
IDENTIFIERS: SHIPBUILDING, GALVANIC SHIELDING,
TRANSLATIONS

(U)

(U)

PAINT - AND - VARNISH COATINGS ARE NOT A RELIABLE
MEANS OF PROTECTION FROM CORROSION AND FOULING OF
SHIP HULLS FOR THE INTER-DOCKING PERIOD. IN
SOVIET AND FOREIGN SHIPBUILDING, ELECTROCHEMICAL
PROTECTION IS USED IN COMBINATION WITH PAINT - AND -
VARNISH COATINGS. PROTECTOR-TYPE (GALVANIC)
SHIELDING AND THE IMPRESSED CURRENT CATHODIC
PROTECTION SYSTEM ARE DISCUSSED AND EVALUATED.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-688 536

11/3

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D
C

SILICATE-ZINC ANTIFOULING PAINTS. STUDIES ON
ANTIFOULING PROPERTIES,

(U)

MAY 69 14F JEDLINSKI, ZBIGNIEW ;
LUKASZCZYK, JAN ; SEKURADZKI, ANDRZEJ ;
REPT. NO. FSTC-HT-23-141-69
PROJ: FSTC-92236282301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF PRZEMYSŁ CHEMICZNY
(POLAND) N11 P687-689 1968.

DESCRIPTORS: (*ANTIFOULING COATINGS, *COPPER
COMPOUNDS), SILICATES, OXIDES, ZINC,
CORROSION, BARNACLES, POLAND

(U)

IDENTIFIERS: COPPER OXIDES, TRANSLATIONS

(U)

ACCELERATED AND LAND TESTS PROVED THAT THE ACTION
OF PRESERVATIVE COATINGS CONSISTING OF SILICATE
PAINTS DEPENDS ON THE CONTENT OF OXIDES OF COPPER IN
THE PAINT MAKING UP THE EXTERNAL LAYER OF THE
COATING. THE CONTENT OF CU₂O IS INCREASED, THE
ANTICORROSION PROPERTIES DECREASE AND ANTIFOULING
PROPERTIES BECOME BETTER. COATINGS WITH 21.1%
CU₂O HAVE GOOD ANTICORROSION PROPERTIES BUT
INSUFFICIENT ANTIFOULING PROPERTIES, PRIMARILY AS
CONCERNS BARNACLES. THE ADDITION OF ZINC OXIDE
(21% CU₂O AND 33.5% ZN AT THE OPTIMUM)
IMPROVES ANTIFOULING WITHOUT HARMING ANTICORROSION
PROPERTIES. (AUTHOR)

(U)

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-689 134

11/3

DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA)

THE APPLICATION OF SCANNING ELECTRON MICROSCOPY TO
ANTIFOULING PAINT RESEARCH, (U)

JUN 68

5P

BISHOP, J. H. I

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN AUSTRALIAN OCCA
PROCEEDINGS AND NEWS, P13-16 MAR 69. NO COPIES
FURNISHED.

DESCRIPTORS: (*ELECTRON MICROSCOPY, *ANTIFOULING
COATINGS); FILMS; PAINTS; AUSTRALIA (U)

IDENTIFIERS: SCANNING ELECTRON MICROSCOPY (U)

ELECTRON MICROSCOPY IS BRIEFLY REVIEWED, WITH
PARTICULAR REFERENCE TO THE RECENTLY ESTABLISHED
TECHNIQUE OF SCANNING ELECTRON MICROSCOPY. THE USE
OF THE SCANNING ELECTRON MICROSCOPE FOR THE STUDY OF
PAINT FILMS IS ILLUSTRATED WITH EXAMPLES OBTAINED
DURING ANTIFOULING PAINT RESEARCH, AND ITS POTENTIAL
USES FOR THE EXAMINATION OF PAINTS IN GENERAL ARE
INDICATED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0H05

AD-691 725

7/3

6/6

11/3

11/8

6/12

ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

ORGANOLEAD CHEMISTRY: SYNTHESSES AND
APPLICATIONS.

(U)

DESCRIPTIVE NOTE: SUMMARY TECHNICAL REPT. 1961-1968,

MAY 69

49P

HENRY, MALCOLM C. SPANT,

BHUVAN C. :

REPT. NO. C/PLSEL-64

PROJ: DA-1-T-062105-A-329

MONITOR: USA-NLABS

TR-69-55-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*LEAD, *METALORGANIC COMPOUNDS),
(*HERBICIDES, *LEAD COMPOUNDS), (*LUBRICANT
ADDITIVES, LEAD COMPOUNDS), (*ANTIFOULING
COATINGS, LEAD COMPOUNDS), (*GERMICIDES, LEAD
COMPOUNDS), (*INSECT CONTROL, LEAD COMPOUNDS),
SYNTHESIS(CHEMISTRY), TOXICITY, FLUORINE
COMPOUNDS, HALOGENATED HYDROCARBONS, MOLLUSCACIDES,
FUNGUS DETERIORATION, COTTON TEXTILES, ORGANIC
SULFUR COMPOUNDS, CHLORINE COMPOUNDS, AZIDES,
THIOLS

(U)

IDENTIFIERS: *PLUMBANES, PLUMBANE/PROPYLTHIO-
TRIPHENYL, PLUMBANE/ACETOXY-TRIPHENYL, PLUMBANE/
METHYLTHIO-TRIPHENYL, PLUMBANE/CHLORO-TRIPHENYL,
PLUMBANE/ETHYLTHIO-TRIPHENYL, LEAD ORGANIC
COMPOUNDS, CHEMOSTERILANTS

(U)

THE CHEMISTRY, SCREENING AND TESTING OF ORGANOLEAD
COMPOUNDS SYNTHESIZED AT THE U. S. ARMY
NATICK LABORATORIES ARE REPORTED AND ANALYZED.
THE RESEARCH CONDUCTED HAS RESULTED IN THE
DEVELOPMENT OF NUMEROUS NEW SYNTHETIC ROUTES TO
ORGANOLEAD COMPOUNDS NOT PREVIOUSLY KNOWN. THESE
NEW SYNTHETIC ROUTES, IN TURN, HAVE OPENED UP A WIDE
VARIETY OF POSSIBILITIES FOR FURTHER SYNTHESIS OF
ADDITIONAL NEW ORGANOLEAD STRUCTURES. THE
SCREENING, TESTING AND EVALUATION OF ORGANOLEAD
CHEMICALS SYNTHESIZED UNDER THIS PROGRAM SHOW THAT
THESE CHEMICALS HAVE A WIDE SPECTRUM OF POTENTIAL
APPLICATIONS. THUS THESE CHEMICALS MAY BE USEFUL
AS LUBRICANT ADDITIVES, BIOCIDES SUCH AS COTTON
PRESERVATIVES AND ANTI-FOULING PAINTS, AND RODENT
REPELLENTS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-692 212 11/3
DEFENCE STANDARDS LABS HARRIBYRNONG (AUSTRALIA).

THE EXAMINATION OF THE STRUCTURE OF ANTIFOULING
COATINGS BY SCANNING ELECTRON MICROSCOPY. (U)

NOV 68 19P BISHOP, J. H. ISILVA, S.
R. 1

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF THE OIL AND COLOUR
CHEMIST'S ASSOCIATION, V52 P201-218 1967. NO COPIES
FURNISHED.

DESCRIPTORS: (*ANTIFOULING COATINGS, *ELECTRON
MICROSCOPY), SURFACE PROPERTIES, VINYL PLASTICS,
PAINTS, COPPER COMPOUNDS, OXIDES, AUSTRALIA (U)
IDENTIFIERS: SCANNING ELECTRON MICROSCOPY, COPPER
OXIDES, LEACHING (U)

THE RECENTLY DEVELOPED SCANNING ELECTRON MICROSCOPE
YIELDED INFORMATION OF MUCH MORE VALUE IN THE STUDY
OF ANTIFOULING PAINT FILMS THAN WAS OBTAINED FROM THE
CONVENTIONAL TRANSMISSION INSTRUMENT. THE
SIGNIFICANCE OF THE INFORMATION OBTAINED IS DISCUSSED
AND IT IS SHOWN THAT CURRENT THEORIES OF THE
MECHANISM BY WHICH TOXICANT IS RELEASED FROM THE FILM
REQUIRE REVISION. FILM POROSITY AND SURFACE
TEXTURE, WHICH ARE DEPENDENT UPON THE PIGMENT
LOADING, AND ALSO THE WIDE VARIATION IN PARTICLE SIZE
AND SHAPE ARE SHOWN TO BE IMPORTANT CONTROLLING
FACTORS. THE CRITICAL PIGMENT VOLUME CONCENTRATION
IS THE PARAMETER WHICH DETERMINES WHETHER OR NOT A
FILM IS POROUS, RATHER THAN A PIGMENT LOADING
CALCULATING ON THE ASSUMPTION THAT THE PIGMENT
PARTICLES CAN BE REGARDED AS UNIFORM SPHERES AS
PREVIOUSLY SURMISED. THE THICKNESS OF THE LAYER OF
MATRIX MATERIAL OVER THE SURFACE OF THE CUPROUS OXIDE
PARTICLES AND THE DEGREE TO WHICH THE LAYER IS
RUPTURED, PROBABLY BY OSMOTIC PRESSURE FORCES, ALSO
HAVE A BEARING ON THE RATE OF LEACHING. DEFECTS IN
ANTIFOULING PAINT FILMS ARE EASILY DETECTED. A
GREEN PATINA OBSERVED ON SOME SURFACE AREAS OF
ANTIFOULING PAINT FILMS REMOVED FROM SHIPS AFTER
SERVICE AT SEA IS ATTRIBUTED TO THE PRESENCE OF LARGE
NUMBERS OF DIATOMS AND NOT NECESSARILY TO THE
PRESENCE OF PRECIPITATED COPPER SALTS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-692 595

11/3

DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA)

ANTI-FOULING PAINTS. I. THEORETICAL APPROACH
TO LEACHING OF SOLUBLE PIGMENTS FROM INSOLUBLE PAINT
VEHICLES, (U)

SEP 68

7P

MARSON, F. I

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF APPLIED
CHEMISTRY, V19 P93-99 APR 69. NO COPIES FURNISHED.

DESCRIPTORS: (•ANTIFOULING COATINGS, SOLUBILITY),
PAINTS, DIFFUSION, OXIDES, COPPER COMPOUNDS,
SURFACE PROPERTIES, AUSTRALIA (U)
IDENTIFIERS: LEACHING, COPPER OXIDES, SURFACE
CHEMISTRY (U)

A THEORETICAL APPROACH TO THE PROBLEM OF HOW
CONTACT LEACHING ANTI-FOULING PAINTS WORK IS
DISCUSSED; A POSSIBLE MECHANISM IS SELECTED AND
APPLIED TO AN IDEALISED MODEL OF A PAINT FILM. A
PRECISE MATHEMATICAL TREATMENT IS THEN ATTEMPTED OF
THE RELATIONSHIP BETWEEN THE LEACHING RATE, THE
PHYSICAL PROPERTIES, AND IF APPLICABLE THE CHEMICAL
PROPERTIES OF THE ENVISAGED PAINT FILM AND ITS
ENVIRONMENT. A MECHANISM PREVIOUSLY PROPOSED HAS
BEEN EXAMINED BY THIS METHOD. AN EQUATION IS
DERIVED FOR AN IDEALISED PAINT FILM RELATING THE
LEACHING RATE TO THE PHYSICAL PROPERTIES OF THE PAINT
FILM AND THE LEACHATE. IT IS ASSUMED THAT THE RATE
OF SOLUTION OF A SOLUBLE PIGMENT FROM AN INSOLUBLE
VEHICLE IS DEPENDENT ONLY ON THE PHYSICAL PROPERTIES
OF THE PAINT FILM AND THE DIFFUSION OF THE SOLVATED
PIGMENT THROUGH THE EXHAUSTED MATRIX AND THE
DIFFUSION LAYER OF LEACHATE IN DIRECT CONTACT WITH
THE SURFACE OF THE PAINT. AN EQUATION IS DERIVED
FOR AN IDEALISED PAINT FILM WHICH RELATES THE
LEACHING RATE TO SOME PHYSICAL PROPERTIES OF THE
PAINT FILM AND OF THE LEACHATE. THE EQUATION IS
SHOWN TO PREDICT QUALITATIVELY THE EFFECT OF MOST
VARIABLES KNOWN TO AFFECT THE LEACHING OF CONTACT
LEACHING PAINTS. SOME EVIDENCE IS GIVEN TO SUPPORT
THE QUANTITATIVE PREDICTION OF THE RELATIONSHIP
BETWEEN THE PIGMENT VOLUME CONTENT AND THE INITIAL
LEACHING RATE, THE EFFECT OF DISSOLVED PIGMENT IN
SOLUTION ON THE LEACHING RATE, THE INCREASE IN
LEACHING RATE FOR A GIVEN TEMPERATURE INCREASE, AND
THE EFFECT OF VELOCITY OF FLOW PAST THE SURFACE OF
THE PAINT FILM.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-698 013 13/8 11/3 13/10
DEFENCE RESEARCH ESTABLISHMENT PACIFIC VICTORIA (BRITISH
COLUMBIA)

CATHODIC REDUCTION OF CUPROUS OXIDE IN VINYL
ANTIFOULING PAINTS.

(U)

MAR 69 17P ANDERTON, W. A. ;
REPT. NO. REPRINT-69-4

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF THE OIL AND COLOUR
CHEMISTS' ASSOCIATION, V52 P711-726 1969. NO COPIES
FURNISHED.

DESCRIPTORS: (CATHODIC PROTECTION, ANTIFOULING
COATINGS); (COPPER COMPOUNDS);
(REDUCTION(CHEMISTRY)), PAINT PRIMERS, COPPER,
VINYL PLASTICS, ELECTROCHEMISTRY, SHIP HULLS
IDENTIFIERS: COPPER OXIDES

(U)

(U)

ON THE CATHODICALLY PROTECTED BOTTOMS OF CANADIAN
NAVAL SHIPS, WHEN COATED WITH A VINYL SYSTEM
INCLUDING A CUPROUS OXIDE PIGMENTED ANTIFOULING
PAINT, BLACK PATCHES ARE FREQUENTLY OBSERVED. IT
HAS BEEN SHOWN THAT THESE PATCHES ARE ELECTRICALLY
CONDUCTIVE AND THAT THE COLOUR IS THE RESULT OF THE
REDUCTION OF CUPROUS OXIDE TO METALLIC COPPER.
THIS PHENOMENON IS OF PRACTICAL IMPORTANCE BECAUSE
THESE AREAS TRANSMIT A RELATIVELY LARGE CATHODIC
CURRENT, WITH THE POSSIBLE CONSEQUENCE THAT THE
CATHODIC PROTECTION SYSTEM MAY BE UNABLE TO SUPPLY
SUFFICIENT CURRENT FOR COMPLETE PROTECTION OF THE
HULL. THE METALLIC COPPER, BEING CATHODICALLY
PROTECTED, WILL NOT GO INTO SOLUTION AND SO FOULING
MAY OCCUR. CATHODIC DEPOSIT ON THE CONDUCTIVE
AREAS MAY INCREASE THE DRAG ON THE SHIP. A
MECHANISM FOR THIS PHENOMENON IS DESCRIBED.
EXPERIMENTAL WORK HAS SHOWN THE CONDITIONS UNDER
WHICH IT OCCURS, AND HOW IT MAY BE LESSENED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-721 029 11/3 11/9
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ANTIADHESION COMPOSITION,

(U)

DEC 70 8P ROSHCHUPKIN, V. I. ;
FAINTSIMER, R. Z. ; CHANYSHÉV, R. O. ; SHVARTS,
A. D. ; YANOVSKII, E. A. ;
REPT. NO. FTD-HT-23-791-70
PROJ: FTD-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF PATENT (USSR) 253
345 2P, 6 OCT 67, BY D. KOOLBECK.

DESCRIPTORS: (*ANTIFOULING COATINGS,
POLYMERIZATION), (*POLYETHYLENE PLASTICS,
MANUFACTURING METHODS), POLYVINYL ALCOHOL,
GELATINS, GLYCOLS, PATENTS, USSR
IDENTIFIERS: *CHEMICAL REACTORS, TRANSLATIONS

(U)

(U)

AN ANTIADHESION COMPOSITION CONTAINING POLYVINYL
ALCOHOL, ETHYLENE GLYCOL, AND DILUENTS WAS
DISTINGUISHED BY THE FACT THAT IN ORDER TO INCREASE
THE DURATION OF ITS ACTION, A HIGH-MOLECULAR
GELATINOUS COMPOUND WAS INTRODUCED, E.G., ALGINATE,
SODIUM CARBOXYMETHYLCELLULOSE, AGAR, OR GELATIN IN A
QUANTITY OF 5-10 PERCENT 58-35 PERCENT GLYCERIN, 10-
20 PERCENT SULFONATED OIL, AND 7-5 PERCENT FILLER,
WHILE POLYVINYL ALCOHOL, ETHYLENE GLYCOL, AND
DILUENTS WERE ADDED IN QUANTITIES OF 10-15, 5-8, AND
5-7 PERCENT RESPECTIVELY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-730 436 11/6
NAVAL RESEARCH LAB WASHINGTON D C

MARINE CORROSION STUDIES: THE EFFECTS OF
CU2O ANTIFOULING PAINT AND COUPLING TO A
COPPER ALLOY ON THE CORROSION RESISTANCE OF
6AL-4V TITANIUM ALLOY IN SEAWATER. (U)

DESCRIPTIVE NOTE: INTERIM PROGRESS REPT. NO. 11,
JUL 71 16P LENNOX, T. J., JR.:
PETERSON, M. H. IGROOVER, R. E. I
REPT. NO. NRL-MR-2333
PROJ: SF51-542-602-12431, NRL-M04-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON MARINE CORROSION
STUDIES.

DESCRIPTORS: (*TITANIUM ALLOYS, *CORROSION
RESISTANCE), ANTIFOULING COATINGS, SEA WATER,
BRASS, CATHODIC PROTECTION, COPPER COMPOUNDS,
OXIDES, COMPATIBILITY, DEGRADATION (U)
IDENTIFIERS: TITANIUM ALLOY 6AL4V (U)

THE 6AL-4V TITANIUM ALLOY EXHIBITED THE
EXPECTED EXCELLENT CORROSION RESISTANCE IN QUIESCENT
SEAWATER; COATING IT WITH CU2O-TYPE ANTIFOULING
PAINT OR COUPLING TO YELLOW BRASS HAD NO DELETERIOUS
EFFECTS ON THE TITANIUM. THE YELLOW BRASS,
HOWEVER, WAS SUBJECT TO SEVERE DEALLOYING WHICH WAS
NOT COMPLETELY ELIMINATED BY CATHODIC PROTECTION FROM
A ZINC ANODE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-746 099 11/6 11/3
NAVAL RESEARCH LAB WASHINGTON D C

MARINE CORROSION STUDIES: THE EFFECTS OF
DISSIMILAR METAL COUPLES AND TOXICANTS FROM
ANTIFOULING PAINTS ON THE CORROSION OF 5086 AND
6061 ALUMINUM ALLOYS AND THEIR RESPONSE TO
CATHODIC PROTECTION. (U)

DESCRIPTIVE NOTE: INTERIM PROGRESS REPT. NO. 14,
MAY 72 86P LENNOX, T. J., JR.;
PETERSON, M. H.; SMITH, J. A.; GROOVER, R.
E.;
REPT. NO. NRL-MR-2444
PROJ: SF51-542-602, NRL-63M04-02
TASK: 12431

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED OCT 71, AD-
736 617.

DESCRIPTORS: (*ANTIFOULING COATINGS, ALUMINUM
ALLOYS), (*ALUMINUM ALLOYS, *CATHODIC
PROTECTION), SEA WATER, CORROSION INHIBITION,
CRACKS, WELDS, LIQUID IMMERSION TESTS, POTOMAC
RIVER (U)

IDENTIFIERS: ALUMINUM ALLOY 5086, ALUMINUM ALLOY
6061, DISSIMILAR METAL COUPLES, *GALVANIC
CORROSION (U)

ALUMINUM ALLOY 5086-H32 WHEN NOT COUPLED TO
DISSIMILAR METALS WAS OBSERVED TO BE CORROSION
RESISTANT IN SEAWATER OR IN THE POTOMAC RIVER AT
WASHINGTON, D.C. SEVERE CORROSION OCCURRED
IN SEAWATER HOWEVER WHEN COUPLED TO ANY OF THE
FOLLOWING DISSIMILAR METALS: COPPER NICKEL, 10%;
YELLOW BRASS; 304 STAINLESS STEEL; OR MILD STEEL.
THIS GALVANIC CORROSION COULD NOT BE COMPLETELY
PREVENTED BY CATHODIC PROTECTION. A MAGNESIUM
ANODE ALSO CAUSED SEVERE CORROSION OF THE ALUMINUM IN
SEAWATER. ALUMINUM ALLOY 6061-T6 WAS SEVERELY
CORRODED WHEN CONTINUOUSLY IMMERSSED IN QUIESCENT
SEAWATER OR IN THE POTOMAC RIVER. IN SEAWATER
CORROSION CAUSED BY THE CUPROUS OXIDE TOXICANT WAS
NOT AS SEVERE AS THAT OBSERVED ON UNCOATED AND
UNPROTECTED 6061-T6 ALUMINUM, BUT IN THE POTOMAC
RIVER THE DEPTH OF CORROSION WAS SIGNIFICANTLY
INCREASED BY THE CUPROUS OXIDE ANTIFOULING COATING.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-750 122 11/3
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER ANNAPOLIS
MD

ANTISLIME COATINGS. PART II -
PRECONDITIONING VALUE OF SLIME FOR BARNACLE
ATTACHMENT. (U)

AUG 72 28P LIBERATORE, G. L. IDYCKMAN,
E. J. MONTEMARANO, J. A. COHN, M. L. I
REPT. NO. NSRDC-28-233
PROJ: ZF61-412-001
MONITOR: NSRDC 3597

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANTIFOULING COATINGS,
EFFECTIVENESS), BARNACLES, SURFACES, FILMS,
BACTERIA, YEASTS, POLYSACCHARIDES, ACIDS, SEA
WATER, EXPOSURE, TEST METHODS, STATISTICAL
ANALYSIS, NAVAL RESEARCH (U)
IDENTIFIERS: SLIME, SUBMERGED SURFACES, BARNACLE
ATTACHMENT (U)

INVESTIGATIONS OF THE RELATIONSHIP BETWEEN BARNACLE
ATTACHMENT AND THE PRESENCE OF A PRIMARY SLIME FILM
ON SUBMERGED SURFACES HAS BEEN COMPLETED. USING
LABORATORY-REARED BARNACLE CYPRIDS IN A STATISTICAL
SETTLEMENT SURVEY, IT HAS BEEN DETERMINED THAT THE
NUMBER OF BARNACLE CYPRIDS SETTLING ON A SLIMED
SURFACE CONSISTENTLY EXCEEDS BY A FACTOR OF TEN THE
NUMBER THAT SETTLE ON A CLEANED CONTROL SURFACE.
DATA DESCRIBING THE SLIME FACTOR AS A NATURALLY
OCCURRING SURFACE-PRECONDITIONING AGENT AFFECTING THE
SETTLEMENT OF OTHER SESSILE ORGANISMS ARE EVALUATED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM03

AD-767 639 13/10 11/3
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA
MD

THE EFFECT OF SURFACE PREPARATION AND
REPAINTING PROCEDURES ON THE FRICTIONAL
RESISTANCE OF OLD SHIP BOTTOM PLATES AS
PREDICTED FROM NSRDC FRICTION PLANE MODEL
4125.

(U)

MAY 73 30P WEST, EUGENE E. ;
REPT. NO. NSRDC-4084

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHIP PLATES, SURFACE ROUGHNESS),
(*SHIP HULLS, *ANTIFOULING COATINGS), PAINTS,
FRICTION, SURFACE PROPERTIES, MEASUREMENT
IDENTIFIERS: PROFILOMETERS

(U)

(U)

THE NAVAL SHIP RESEARCH AND DEVELOPMENT
CENTER USED A FRICTION PLANE (NSRDC MODEL 4125)
TO ESTIMATE THE DIFFERENCES IN FRICTIONAL RESISTANCE
OF TWO TYPES OF ANTIFOULING PAINTS AND OF OLD SHIP
BOTTOM PLATES IN THREE SURFACE CONDITIONS.
PHOTOGRAPHS AND ROUGHNESS MEASUREMENTS ARE INCLUDED
FOR EACH SURFACE INVESTIGATED TOGETHER WITH
EXPERIMENTAL DATA EXPRESSED AS VALUES OF ROUGHNESS
ALLOWANCE COEFFICIENT VERSUS REYNOLDS NUMBER.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-829 344 6/3 11/3 11/1 6/16
SAN FRANCISCO BAY NAVAL SHIPYARD VALLEJO CALIF PAINT
LAB

ATTACHMENT MECHANISM OF BARNACLES. FOULING
PREVENTION THE STUDY OF THE ADHESION OF CALCAREOUS
TYPES ATTACHING MARINE ORGANISMS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 1,
FEB 68 58P SAROYAN, JOHN R. ; LINDNER,
ELEK ; DOOLEY, CAROL A. ;
REPT. NO. SFRAN-BAY-68-1
PROJ: SF-020-99-02
TASK: 11906

UNCLASSIFIED REPORT

DESCRIPTORS: (*BARNACLES, ATTACHMENT),
(*ANTIFOULING COATINGS, DESIGN), (*ADHESIVES,
DESIGN), FOULING, ADHESION, PHYSICAL
PROPERTIES, CHEMICAL PROPERTIES, BONDING, WETTING,
SECRETION, CRUSTACEA, FORCE (MECHANICS),
OCEAN CURRENTS, VELOCITY, DRAG,
APPROXIMATION (MATHEMATICS) (U)
IDENTIFIERS: CIRRIPIEDIA, BALANUS, LEPADIDAE (U)

THE INITIAL ATTACHMENT OF THE BARNACLE IS SHOWN TO
BE A PURELY MECHANICAL HOLD BY THE SUCTION CUPS OF
THE CYPRID ANTENNAE. AN ADHESIVE CEMENT MAY BE
SECRETED FOR REINFORCEMENT BUT IS NOT ESSENTIAL FOR
PERMANENT ATTACHMENT. THE BALANIDAE HAVE
PERMANENT, PERIODICALLY FUNCTIONING GLANDS WHICH ARE
LOCATED IN THE LIVING MANTLE TISSUE. THESE GLANDS
DEVELOP DIRECTLY FROM THE CYPRID CEMENT GLANDS.
THE CEMENT GLANDS AND THE REST OF THE CEMENTING
APPARATUS OF THE BALANIDAE ARE BASICALLY IDENTICAL
WITH THOSE OF THE LEPADIDAE. THE CEMENTING
APPARATUS IS FLUSHED AFTER EACH CEMENT SECRETION.
IN THIS WAY, OLD DUCTS ARE KEPT OPEN FOR EMERGENCY
REPAIR OR REATTACHMENT. THIS EMERGENCY SECRETION
IS EXPECTED TO BE CHEMICALLY IDENTICAL TO THE CYPRID
AND THE NORMALLY SECRETED ADULT CEMENT. (U)

III
DIFFUSION COATINGS

97

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM06

AD-603 002

CHANCE VUGHT CORP DALLAS TEX

DIFFUSION COATING PROCESS FOR COLUMBIUM BASE
ALLOYS.

(U)

DESCRIPTIVE NOTE: REPT. FOR FEB 61-FEB 62,
JUN 64 166P AVES, WILLIAM L. JR.;
BOURLAND, GORCON W. IFEATHERSTON, ALECK B. IFORCHT,
BRENNAN A. IO' KELLY, KENT P. I

REPT. NO. 00-122

CONTRACT: AF33 616 7896

PROJ: AF-7381

TASK: 738102

MONITOR: AFML TDR64 71

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COATINGS, REFRACTORY METAL ALLOYS),
(*NIOBIUM ALLOYS, COATINGS), (*DIFFUSION, COATINGS),
SILICON COATINGS, OXIDATION, SHEETS, MECHANICAL
PROPERTIES, HIGH-TEMPERATURE RESEARCH, REFRACTORY
COATINGS, HEAT SHIELDS, SILICIDES, ENVIRONMENTAL TESTS,
VANADIUM ALLOYS, TITANIUM ALLOYS, ZIRCONIUM ALLOYS,
CHROMIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS,
MOLYBDENUM ALLOYS, CHROMIUM, ALUMINUM, BORON, HALIDES,
DENSITY, ELECTROPLATING, PARTICLE SIZE, FLAME SPRAYING,
CLADDING, VAPOR PLATING (U)

IDENTIFIERS: NIOBIUM ALLOY D-31, NIOBIUM ALLOY C-103,
NIOBIUM ALLOY 1ZR, NIOBIUM ALLOY FS-80, NIOBIUM ALLOY
FS-82, DIFFUSION COATING (U)

A STUDY WAS CONDUCTED TO IMPROVE AND OPTIMIZE
COATINGS FOR COLUMBIUM ALLOYS, PROTECTIVE IN AIR TO
2600F FOR AT LEAST 10 HOURS. PROCESS VARIABLES
OF TWO DIFFERENT SILICIDE BASE COATING SYSTEMS (SI-
CR-AL AND SI-CR-B) APPLIED BY A TWOSTEP
PACK CEMENTATION PROCESS WERE OPTIMIZED BY
STATISTICAL METHODS. COATINGS WERE EVALUATED ON
D-31, C-103, CB-1ZR (FS-80), AND FS-82
COLUMBIUM ALLOYS. OXIDATION RESISTANCE TESTING
INCLUDED FURNACE TESTING IN MOVING AIR, SUSTAINED
LOAD THERMAL CYCLING, PROPANE TORCH AND RAM-JET
TESTS. TENSILE STRENGTH AND BEND PROPERTIES OF
UNCOATED AND COATED ALLOYS WERE EVALUATED AT ROOM AND
ELEVATED TEMPERATURES. AN ANALYTICAL EVALUATION OF
THESE SYSTEMS WAS CONDUCTED TO CHARACTERIZE THE
COATING COMPONENTS.

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/ZDM06

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-641 277 20/12 13/8
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

DIFFUSED LAYERS OF SEMICONDUCTIVE COMPOUNDS OF GROUP
III AND V. (U)

OCT 66 7P GUNTHER, A. I
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1-Z-624201-D-466
MONITOR: AERDL, TT T-1877-66, 66-62543

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AUFDAMPFSCHICHTEN AUS HALBLEITENDEN
III - VERBONDUNGEN, TRANS. OF DIE
NATURWISSENSCHAFTEN (WEST GERMANY) V45 P415-5 1958.

DESCRIPTORS: (SEMICONDUCTING FILMS, DIFFUSION
COATING), WEST GERMANY, INDIUM ALLOYS, ANTIMONY
ALLOYS, ARSENIC ALLOYS, CRYSTAL GROWTH, HALL
EFFECT

IDENTIFIERS: THIN FILMS

(U)

(M)

WITH THE SEMICONDUCTIVE COMPOUNDS OF ELEMENTS OF
GROUP III AND GROUP V (INDICATE IN REF. 1,) WE
HAVE AVAILABLE SUBSTANCES CHARACTERIZED BY A HIGH
HALL COEFFICIENT AND HIGH ELECTRON MOBILITY AND
CONSEQUENTLY PARTICULARLY SUITABLE FOR THE PRODUCTION
OF EFFICIENT HALL ELEMENTS, SO-CALLED HALL
GENERATORS. AMONG THESE COMPOUNDS, INDIUM
ANTIMONIDE AND ARSENIDE ARE ESPECIALLY APPROPRIATE
FOR THIS PURPOSE. IN ORDER TO INCREASE SENSITIVITY
AS WELL AS FOR REASONS OF MATCHING, IT IS DESIRABLE
TO PRODUCE COMPOUNDS OF THIS TYPE IN THE FORM OF THIN
FILMS. IF WE UTILIZE THE METHOD OF VACUUM
DIFFUSION, CONSIDERABLE DIFFICULTIES RESULT WHICH ARE
BASED, IN THE LAST ANALYSIS, ON THE DIFFERENT VAPOR
PRESSURES OF THE TWO INDIVIDUAL COMPONENTS. AS A
CONSEQUENCE, THE SUBSTANCES, UNDER HEATING IN VACUUM,
DECOMPOSE, DIFFUSE IN FRACTIONS AND GIVE RISE TO THE
FORMATION OF INHOMOGENEOUS FILMS WHICH CONSIST OF
SUPERPOSED ZONES OF THE INDIVIDUAL COMPONENTS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-643 803 774 11/6
REDSTONE SCIENTIFIC INFORMATION CENTER REDSTONE ARSENAL
ALA

DETERMINATION OF THE DIFFUSION COEFFICIENTS IN ALLOYS
WITH SEVERAL PHASES, (U)

OCT 66 14P BORISOV, V. T. IGOLIKOV, V. M. 3
DUBININ, G. N. 1
REPT. NO. RSIC-604
MONITOR: TT 67-60229

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF AKADEMIYA NAUK SSSR.
IZVESTIYA. METALLURGIYA I GORNOE DELO, N4 P147-52
1964.

DESCRIPTORS: (*SURFACES, DIFFUSION COATING),
(*DIFFUSION COATING, ALLOYS), THERMOCHEMISTRY,
PHASE STUDIES, CHROMIZING, SILICON COATINGS,
ALUMINUM COATINGS, CORROSION RESISTANCE,
ELECTRICAL PROPERTIES, MAGNETIC PROPERTIES (U)

INVESTIGATED IS THE METHOD FOR DETERMINING THE
DIFFUSION COEFFICIENT IN CASES WHEN A MULTIPHASE
DIFFUSION LAYER IS FORMED ON THE SURFACE ZONE OF A
METAL. THE CALCULATION OF THE DIFFUSION
COEFFICIENT IS MADE BY USING AS AN EXAMPLE THE
CHROMIUM-SATURATION OF IRON IN A GAS PHASE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-697 919 13/8 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIFFUSION SILICONIZING OF MOLYBDENUM, TUNGSTEN,
AND NIOBIUM IN MOLTEN SALTS, (U)

SEP 69 IIP ANFINOGENOV, A. I. ;
ILYUSHCHENKO, N. G. ; BELYAEVA, G. I. ;
FINKELShteIN, S. D. ;
REPT. NO. FTD-HT-23-440-69
PROJ: FTD-7230178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF AKADEMIYA NAUK
SSSR. URALSKII FILIAL, SVERDLOVSK. INSTITUT
ELEKTROKHIMII. TRUDY, NII P67-73 1968, BY D.
KOOLBECK.

DESCRIPTORS: (*REFRACTORY METALS, *SILICON
COATINGS), (*DIFFUSION COATING, REFRACTORY
METALS), CORROSION INHIBITION, MOLYBDENUM,
TUNGSTEN, NIOBIUM, SILICIDES, CORROSION
RESISTANCE, SALTS, SILICATES, FLUORIDES, SODIUM
COMPOUNDS, POTASSIUM COMPOUNDS, SODIUM CHLORIDE,
CHLORIDES (U)

IDENTIFIERS: TRANSLATIONS, FUSED SALTS, SODIUM
FLUORIDES, SILICATE/HEXAFLUORO, SODIUM
HEXAFLUOROSILICATE, POTASSIUM CHLORIDE (U)

THE REPORT CONCERNS SILICONIZING (SILICIDING)
OF MO, W, AND NB IN MOLTEN SALTS IN AN ARGON
ATMOSPHERE. THE OBTAINED COATINGS WERE STUDIED
METALLOGRAPHICALLY AND BY X-RAY DIFFRACTION METHODS
(IN THE LATTER CASE, ONLY FOR SILICIDE COATINGS ON
MOLYBDENUM). DATA ON COATING THICKNESS AND
WEIGHT INCREMENTS, ALONG WITH RESULTS OF TESTS FOR
OXIDATION RESISTANCE, ARE PRESENTED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-706 368 11/3

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PROTECTIVE COATINGS ON METALS. NUMBER 2, 1968
(SELECTED ARTICLES),

(U)

FEB 70 120P RUZINOV, L. P. ILAINER, G.
I. IALEKSYUK, M. M. BORISOV, E. V. IZEMSKOV,
G. V. I

REPT. NO. FTD-MT-24-21-70

PROJ: FTD-6010704

TASK: DIA-T68-01-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF ZASHCHITNYE
POKRYTIYA NA METALLAKH (USSR) N2 P39-45, 73-80, 94-98,
104-117, 124-133, 150-154, 170-188, 272, 274-277, 282-283,
286-289 1968, BY ROBERT A. POTTS,

DESCRIPTORS: (*DIFFUSION COATING, METALS),
DEPOSITION, HEAT-RESISTANT METALS + ALLOYS,
REACTION KINETICS, OXIDATION, REFRACTORY COATINGS,
NICKEL ALLOYS, DIFFUSION, STEEL,
SUPERCONDUCTORS, CHROMIUM ALLOYS, CLADDING,
DIFFUSION BONDING, USSR

(U)

IDENTIFIERS: TRANSLATIONS, *PROTECTIVE
COATINGS

(U)

CONTENTS: CHEMICAL THERMODYNAMICS OF COMPLEX
DEPOSITION OF ELEMENTS ON THE SURFACE OF CERTAIN
METALS; METHODS OF CALCULATION OF CONSTANTS,
CHARACTERIZING THE DIFFUSION PROCESSES DURING
OXIDATION, FOR CASES OF HETEROPHASE INTERACTION WITH
COMPLEX KINETICS; METHODOLOGY OF HIGH-TEMPERATURE
MECHANICAL TESTS OF MATERIALS WITH COATINGS;
DISSOLUTION DURING HIGH-TEMPERATURE SERVICE OF
PROTECTIVE COATINGS ON MOLYBDENUM; SURFACE ALLOYING
OF ZHS6-K ALLOY WITH THREE ELEMENTS; HEAT
RESISTANCE OF ALLOY ZHS-6K AFTER MULTICOMPONENT
DIFFUSION SATURATION; SCORE-RESISTANT VACUUM
DIFFUSION COATINGS ON STEELS AND ALLOYS, USED IN
TURBINE CONSTRUCTION; THERMAL DIFFUSION SATURATION
OF MOLYBDENUM IN TERMS OF BORON; CLADDING OF PARTS
IN POWDERS AND SOME QUESTIONS OF THEORY OF DIFFUSION
SATURATION; STUDY OF STRUCTURAL FEATURES OF THE
DIFFUSION ZONE AND KINETICS OF DEFORMATION OF CLAD
STEEL WITH A PROTECTIVE CHROMIUM-NICKEL LAYER;
COATING WIRE WITH SUPERCONDUCTING COMPOUND.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-708 707 11/2 13/8
IOWA STATE UNIV AMES ENGINEERING RESEARCH INST

CHEMICAL STRENGTHENING OF AL₂O₃.

(U)

DESCRIPTIVE NOTE: SPECIAL REPT.,

NOV 69 22P JONES, JOHN T. FRASIER,

JOHN T. I

REPT. NO. ERI-62100

CONTRACT: F33615-68-C-1034

PROJ: ERI-713-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINA, *DIFFUSION COATING),
(*SAPPHIRES, MECHANICAL PROPERTIES), SURFACE
PROPERTIES, ANNEALING, IRON OXIDES, CHROMIUM
COMPOUNDS, COBALT COMPOUNDS, NIOBIUM COMPOUNDS,
OXIDES

(U)

IDENTIFIERS: *VAPOR DEPOSITION, CHROMIUM OXIDES,
CORALT OXIDES, NIOBIUM OXIDES, *SURFACE
HARDENING, THEMIS PROJECT

(U)

SURFACE LAYERS WERE CHEMICALLY FORMED ON SAPPHIRE
AND 99+X POLYCRYSTALLINE ALUMINA SPECIMENS BY
ANNEALING THE SAMPLES WHILE ENVELOPED IN VARIOUS
OXIDE POWDERS. QUANTITATIVE OBSERVATIONS WERE MADE
BY MEASURING THE CHANGE IN STRENGTH BETWEEN THE
CHEMICALLY TREATED SPECIMENS AND THOSE WHICH WERE NOT
CHEMICALLY TREATED. THE POLYCRYSTALLINE SPECIMENS
WERE TREATED WITH CR₂O₃, CO(X)O(Y),
NB₂O₅, FE₂O₃ OR CR₂O₃ + CRCL₃.
ALL TREATMENTS WITH THE EXCEPTION OF FE₂O₃ AND
NB₂O₅ RESULTED IN SIGNIFICANT STRENGTH INCREASES.
SAPPHIRE EXHIBITED CONSIDERABLE STRENGTH INCREASES
WHEN TREATED WITH CR₂O₃ OR CR₂O₃ +
CRCL₃. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-719 783

11/3

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CARBIDIZING OF SPHERICAL POWDERS OF NIOBIUM,
MOLYBDENUM, AND TUNGSTEN.

(U)

NOV 70

12P

KRASKOV, A. N. IBURYKINA, A.

L. I

REPT. NO. FTD-HT-23-552-70

PROJ: FTD-604010

TASK: DIA-T69-04-09

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF ZASHCHITNYE
POKRYTIYA NA METALLAKH (USSR) N2 P261-268 1968, BY
V. MESENZEFF.

DESCRIPTORS: (*REFRACTORY COATINGS, DIFFUSION
COATING), (*DIFFUSION COATINGS, REFRACTORY
METALS), CARBIDES, NIOBIUM, MOLYBDENUM,
TUNGSTEN, POWDER METALS, USSR

(U)

IDENTIFIERS: TRANSLATIONS

(U)

THE DEALS WITH THE CARBIDIZING (IN LAMP-BLACK)
OF SUCH REFRACTORY METALS AS NB, MO AND W,
OBTAINED IN POWDER FORM BY MEANS OF PLASMA-JET
ATOMIZING. THE FOLLOWING POWDER FRACTIONS WERE
USED: 1200, 800, 700, 500, 400, 300, 250, 200 AND
100 MU M. DIFFUSION ANNEALING WAS CARRIED OUT AT
1973K FOR NB, 1673 AND 1773K FOR MO AND
1873K AND 1973K FOR W, AND THE TIME OF THE
DIFFUSION PLATING OF EACH OF THE ABOVE SPHERICAL
PARTICLE FRACTIONS IN RELATION TO THE ABOVE
TEMPERATURES, REQUIRED TO OBTAIN A CARBIDE COATING OF
SPECIFIED DEPTH, WAS CALCULATED WITH THE AID OF A
MINSK-12 COMPUTER.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-720 365

11/3

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

A STUDY OF ALUMOSILICONIZED DIFFUSION LAYERS
ON NICKEL-CHROMIUM ALLOY,

(U)

NOV 70 IOP ZEMSKOV, G. V. IKOGAN, R.

P. IKOSTENKO, A. V. IVIDERMAN, V. S. I

REPT. NO. FTD-HT-23-845-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF KHIMIKO-
TEKHICHESKAYA OBRABOTKA STALI I SPLAVOV (USSR) NO
P96-100 1969, BY LOUISE HEENAN.

DESCRIPTORS: (*DIFFUSION COATING, SILICIDES),
(*NICKEL ALLOYS, DIFFUSION COATING), (*COATINGS,
CORROSION INHIBITION), CHROMIUM ALLOYS, ALUMINUM
COMPOUNDS, USSR

(U)

IDENTIFIERS: ALUMINUM SILICIDES, TRANSLATIONS

(U)

IN THE STUDY OF ALUMOSILICONIZED COATINGS, THE
FOLLOWING DIFFERENCES FROM CALORIZED COATINGS WERE
OBSERVED: (1) THE PRESENCE OF 5-7% SI; (2)
INCREASED ALUMINUM CONTENT AND A CORRESPONDINGLY
DECREASED NICKEL CONTENT; (3) A REDUCTION IN THE
NUMBER OF OTHER PHASES, BESIDES THE PHASE ON A
Ni₂Al₃ BASE. ALL THE INDICATED DIFFERENCES
CONTRIBUTE TO THE HEIGHTENED OXIDATION RESISTANCE OF
THE COMPLEX DIFFUSION LAYER. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-720 370 11/6 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

STRUCTURE OF THE DIFFUSION LAYERS AND THE
PROPERTIES OF THE ZHS6K ALLOY ALUMINIZED
BY THE CIRCULATION METHOD;

(U)

DEC 70 10P PROKOSHIN, D. A. IARZAMASOV,
B. N. IKOLMAKOV, B. G. ;
REPT. NO. FTD-MT-24-301-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF IZVESTIYA
VYSSHIKH UCHEBNYKH ZAVEDENIY. MASHINOSTROENIE
(USSR) N1 P123-125 N.D., BY LEE D. THOMPSON.

DESCRIPTORS: (*NICKEL ALLOYS, *DIFFUSION COATING),
HEAT-RESISTANT METALS + ALLOYS, INTERMETALLIC
COMPOUNDS, USSR

(U)

IDENTIFIERS: TRANSLATIONS

(U)

THE STRUCTURE OF THE DIFFUSION LAYERS OF THE
ZHS6K ALLOY AFTER GAS ALUMINIZATION BY THE
CIRCULATION METHOD, AND ALSO THE EFFECT OF
ALUMINIZING ON THE HEAT RESISTANCE AND LASTING
STRENGTH OF THE ALLOY IS STUDIED. COMPARATIVE
RESEARCH OF THESE PROPERTIES AFTER ALUMINIZING THE
ALLOY BY CIRCULATION METHOD AND IN A POWDER MIXTURE
WAS ACCOMPLISHED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-726 954

11/3

ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN
MASS

WEAR- AND EROSION-RESISTANT COATINGS FOR
TITANIUM ALLOYS IN ARMY AIRCRAFT.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

DEC 70

23P

LEVY, MILTON MORROSSI, JOSEPH

L. 1

REPT. NO. AMMRC-TR-70-36

PROJ: DA-1-T-062105-A-320

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, *TITANIUM ALLOYS),
(*ELECTROLESS PLATING, *NICKEL), WEAR
RESISTANCE, EROSION, INHIBITION, ARMY AIRCRAFT,
DIFFUSION COATING

(U)

IDENTIFIERS: PROTECTIVE COATINGS, TITANIUM ALLOY
6AL2SN6V, TITANIUM ALLOY 8AL1MO1V

(U)

DIFFUSION-BONDED ELECTROLESS NICKEL PLATE WAS
INVESTIGATED AS A WEAR-RESISTANT COATING FOR TITANIUM
ALLOYS 6AL1-6V-2SN AND 8AL1-MO1V. PLATE
ADHESION AND DIFFUSION ZONE STRUCTURE WERE ASSESSED
BY METALLOGRAPHIC AND X-RAY DIFFRACTION TECHNIQUES.
EFFECTS OF THE DIFFUSION HEAT TREATMENTS ON
MECHANICAL PROPERTIES AND WEAR CHARACTERISTICS OF THE
TITANIUM ALLOYS WERE DETERMINED. THE DIFFUSION
BONDING PRODUCED A SURFACE OF NICKEL-RICH
INTERMETALLICS WHICH SIGNIFICANTLY IMPROVED THE WEAR
RESISTANCE OF THE TITANIUM ALLOYS WITHOUT ANY
APPRECIABLE DEGRADATION OF THEIR STRUCTURAL
INTEGRITY. (AUTHOR)

(U)

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-727 937 11/3

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

BORONIZING OF MACHINE AND TOOL PARTS IN
POWDERED MIXTURES,

(U)

JUN 71 IIP EPIK, A. P. IBERKACH, V.

D. IKOTLYARENKO, L. A. ISOSHOVSKII, L. A. I

REPT. NO. FTD-MC-23-342-71

PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF TEKHNLOGIYA I
ORGANIZATSIYA PROIZVODSTVA (USSR) N2 P69-71 1970.

DESCRIPTORS: (*DIFFUSION COATING, BORIDES); WEAR
RESISTANCE, USSR

(U)

IDENTIFIERS: TRANSLATIONS

(U)

A TECHNOLOGICAL SCHEME IS PRESENTED FOR BORONIZING
IN SATURATING POWDER MIXTURES. SOME DATA ARE GIVEN
ON THE USE OF THIS METHOD OF BORATION FOR INCREASING
THE SERVICE LIFE OF MACHINE PARTS AND INSTRUMENTS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-729 826 11/3 13/8 19/6
TRW INC CLEVELAND OHIO

A STUDY AND EVALUATION OF THE EFFECTS OF
VARIOUS NEW SURFACE DIFFUSION TREATMENTS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 71 94P CHASE, JOSEPH J. CRUMP, D.
N. 1
REPT. NO. ER-7437-2
CONTRACT: DAAFO1-70-C-0260
MONITOR: AMSWE-RE 71-50

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIFFUSION COATING, STEEL), (*CASE
HARDENING, *SMALL ARMS), SMALL ARMS, HARDNESS,
FATIGUE (MECHANICS), METALLOGRAPHY,
EROSION

(U)

A SERIES OF STEELS WERE TREATED WITH VARIOUS
SURFACE COATING PROCESSES. WITH THE EXCEPTION OF
CHROMIUM PLATING, ALL SURFACE TREATMENTS INVOLVED
DIFFUSION. FOLLOWING METALLOGRAPHIC EXAMINATION,
HOT HARDNESS AND BEND TESTING CONDUCTED DURING THE
INITIAL PHASE OF THE PROGRAM, TEN MATERIAL/SURFACE
COATING TREATMENTS WERE SELECTED FOR FURTHER TEST
EVALUATION. THESE INCLUDED: CHROMIUM PLATED,
CHROMIZED AND BORONIZED 4150 STEEL; LONITRIDED
NITRALLOY 135 MODIFIED NITRIDING STEEL;
CARBURIZED, DIFFUSION NITRIDED AND TUFFTRIDED LOW
CARBON H-12 STEEL; AND BORONIZED, SILICONIZED AND
ALUMINIZED 250 MARAGING STEEL. THESE MATERIAL
SYSTEMS WERE SUBJECTED TO MECHANICAL FATIGUE, THERMAL
FATIGUE AND CHEMICAL EROSION TESTS. CONSIDERING THE
RESULTS OF ALL TESTS PERFORMED, THE TUFFTRIDED AND
THE DIFFUSION NITRIDED LOW CARBON H-12 STEEL APPEAR
MOST PROMISING. THE 250 MARAGING STEEL WITH VARIOUS
METALLIC DIFFUSION COATINGS EXHIBITED EXCELLENT
RESISTANCE TO THERMAL FATIGUE, BUT WAS POOR IN
MECHANICAL FATIGUE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-734 899 11/8

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INCREASING THE RESISTANCE OF MACHINE PARTS TO
SEIZING;

(U)

OCT 71 16P NAINAR, JIRI ;
REPT. NO. FTD-HG-23-961-71
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MONO.
MATERIALOVY SBORNIK 1969. MATERIALY ODOLNE PROTI
OPOTREBENI A METODY JEHO ZKOUSENI (MATERIAL
COLLECTION 1969. MATERIALS RESISTANT TO WEAR AND
METHODS OF TESTING IT); PRAGUE, 1969 P81-92.

DESCRIPTORS: (*ANTISEIZE COMPOUNDS, *SULFIDES),
(*LUBRICANTS, *MOLYBDENUM COMPOUNDS),
(*DIFFUSION COATING, ANTISEIZE COMPOUNDS),
LUBRICATION, FRICTION, MACHINES,
CZECHOSLOVAKIA

(U)

IDENTIFIERS: TRANSLATIONS, MOLYBDENUM DISULFIDE,
SULFURIZATION

(U)

A REVIEW IS GIVEN OF THE RESULTS OBTAINED IN
CZECHOSLOVAKIA WITH THE USE OF SULFURIZATION OF
FRICTION SURFACES, AND OF THE MOS (SUBSCRIPT
2) LUBRICANT.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-742 371 13/9 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PRODUCTION TESTS OF BORONATED, BOROCHROMIZED,
BOROCALORIZED, AND BOROTITANIUMIZED PARTS OF
TWISTING AND DRAWING MACHINES, (U)

FEB 72 7P PASECHNIK, S. YA. IKOROTKOV,
V. D. ILOKOTOCH, O. V. IAFAKASEV, A. A. I
TUTOV, G. S. I
REPT. NO. FTD-HT-23-1229-71
PROJ. AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF ZASHCHITNYE
POKRYTIYA NA METALLAKH (USSR) N3 P220-222 1970, BY
V. MESENZEFF.

DESCRIPTORS: (*MACHINE TOOLS, WEAR RESISTANCE),
(*DIFFUSION COATING, MACHINE TOOLS), HEAT
TREATMENT, DRAWING (MACHINE PROCESSING), NYLON,
USSR (U)

IDENTIFIERS: TRANSLATIONS, BORIDING, COLORIZING,
PROTECTIVE COATINGS (U)

IT IS SHOWN THAT PARTS WERE INSTALLED ON MACHINES
USED FOR HOT DRAWING OF CAPRON FIBER. THE WEAR
RESISTANCE OF HEADPIECES STRENGTHENED BY METHODS OF
THERMOCHEMICAL TREATMENT IS HIGH, AND THE QUALITY OF
FIBER PREPARED ON EXPERIMENTAL HEADPIECES IS
INCREASED BY THIS APPROACH. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-747 429

11/6

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIFFUSION INTERACTION OF COMPONENTS DURING THE
CALORIZING OF NIOBIUM-TITANIUM ALLOYS, (U)

MAY 72 14P

VERGASOV, L. I. ILAZAREV, E.

M. ;

REPT. NO. FTD-MT-24-1874-71

PROJ: AF-3066

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF FIZIKA I
KHIMIYA OBRABOTKI MATERIALOV (USSR) N6 P46-49 1970,
BY RENE E. COURVILLE.

DESCRIPTORS: (*DIFFUSION COATING, NIOBIUM ALLOYS),
(*NIOBIUM ALLOYS, ALUMINUM COATINGS), (*TITANIUM
ALLOYS, ALUMINUM COATINGS), HEAT-RESISTANT METALS
+ ALLOYS, DIFFUSION, INTERACTIONS, USSR (U)

IDENTIFIERS: CALORIZING, TRANSLATIONS (U)

THE STUDY CONCERNS THE PROCESS OF THERMAL DIFFUSION
CALORIZATION OF NIOBIUM ALLOYS WITH TITANIUM (FROM
5 TO 50 WT. PERCENT), THE REDISTRIBUTION OF
COMPONENTS IN BOTH THE ALLOY AND COATING, AND THE
'ASCENDING' DIFFUSION OF TITANIUM INTO THE COATING,
WHICH IS EXPLAINED BY THE HIGH DIFFUSION MOBILITY OF
TITANIUM AND THE THERMODYNAMIC CHARACTERISTICS OF ITS
INTERACTION WITH ALUMINUM. THE RESISTANCE OF THE
COATING TO OXIDATION AT 1100 AND 1200 DEGREES C HAS
BEEN ANALYZED AND THE COMPOSITION OF THE CORROSION
PRODUCTS OF THE ALITIZED ALLOYS DETERMINED.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM06

AD-748 021 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE RESULTS OF TESTS OF METALLIC AND
POLYMER COATINGS OF STEEL PIPELINES OF
SHIPS;

(U)

JUN 72 22P ZHUR, N. V. ILENKOVA, L.
N. ISUPRUN, A. I
REPT. NO. FTD-MT-24-1738-71
PROJ: FTD-60108010A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF TSENTRALNYI
NAUCHNO-ISSLEDOVATELSKII INSTITUT, MORSKOGO FLOTA.
TEKHNICHESKAYA EKSPLUATATSIYA MORSKOGO FLOTA
(USSR) N116 P82-97 1969, BY FRANCIS T. RUSSELL.

DESCRIPTORS: (*COATINGS, *CORROSION INHIBITION),
PIPES, STEEL, PLASTIC COATINGS, METAL COATINGS,
ZINC COATINGS, ALUMINUM COATINGS, CHROMIUM,
DIFFUSION COATING, USSR, SHIPS
IDENTIFIERS: TRANSLATIONS

(U)
(U)

RESULTS OF LABORATORY, STAND, AND FULL-SCALE TESTS
OF SEA WATER-RESISTANCE SHOWN BY THERMODIFFUSION-
CHROMIUM, ALUMINUM, AND POLYMERIC COATINGS ARE
PRESENTED. BASED ON THESE TEST RESULTS, THE
EFFECTIVENESS OF EACH OF THE COATINGS LISTED IS
EXAMINED, AS IS THEIR USEFULNESS IN PROTECTING STEEL
SHIP PIPELINES AGAINST CORROSION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-749 089

11/3

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

INFLUENCE OF DIFFUSION COATINGS ON STEEL
PRODUCT STRENGTH;

(U)

AUG 72 179P KARPENKO, G. V. IPOKHMURSKII,
V. I. ; DALISOV, V. B. ; ZAMIKHOVSKII, V. S. I

REPT. NO. FSTC-HT-23-1139-72

PROJ: FSTC-T7U23012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF MONO. VLIYANIE
DIFFUZIONNYYKH POKRYTII NA PROCHNOST STALNYYKH
IZDELII, KIEV, 1971 167P.

DESCRIPTORS: (*DIFFUSION COATING, *STEEL), METAL
COATINGS, STRESSES, CASE HARDENING, PROTECTIVE
TREATMENTS, MICROSTRUCTURE, CORROSION, USSR

(U)

IDENTIFIERS: TRANSLATIONS, PROTECTIVE COATINGS,
RESIDUAL STRESSES

(U)

THE EFFECT OF GALVANIC AND PRINCIPALLY OF DIFFUSION
COATINGS OF STEEL PRODUCTS ON THEIR SHORT-TERM STATIC
AND FATIGUE STRENGTH IN AIR AND IN CERTAIN WORKING
MEDIA IS EXAMINED. THE ROLE OF RESIDUAL STRESSES IS
EXAMINED AND A NEW CLASSIFICATION OF THEM IS
PROPOSED. IT IS SHOWN POSSIBLE TO CURE CRACK-TYPE
DEFECTS BY MEANS OF DIFFUSION METALLIZATION AND
RESTORATION OF THE INTEGRITY AND STRENGTH OF
DEFECTIVE PARTS. CERTAIN METHODS OF INTENSIFYING
THE PROCESSES OF DIFFUSION SATURATION ARE OFFERED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-750 533 11/3 13/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE INFLUENCE OF SOME GALVANIC AND
THERMODIFFUSIVE COATINGS ON THE DURABILITY OF
SHAFTS AND HINGED JOINTS, (U)

AUG 72 11P PAVLENKO, V. S. IPREIS, G.

A. I

REPT. NO. FTD-MT-24-109-72

PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF
TEKHNOLOGIYA I ORGANIZATSIYA PROIZVODSTVA (USSR) N4
P27-29 1970, BY CHARLES T. OSTERTAG, JR.

DESCRIPTORS: (*COATINGS, WEAR RESISTANCE), METAL
COATINGS, DIFFUSION COATING, CHROMIZING, BUSHINGS,
STEEL, ANODIC COATINGS, METAL JOINTS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE EFFECT OF CERTAIN GALVANIC AND THERMODIFFUSIVE
COATINGS ON THE WEAR RESISTANCE OF PARTS OF LOW LOAD
HIGH SPEED HINGED ASSEMBLIES IN ROCKER MOTION IS
DESCRIBED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-753 327 1976 1378
IIT RESEARCH INST CHICAGO ILL

GAS-PRESSURE BONDING OF MULTILAYER GUN
BARRELS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 72 55P BEAL, ROY E.; WATTHOUGH,
THOMAS ;
REPT. NO. IITRI-B6108-4
CONTRACT: DAAFO1-71-C-0021
MONITOR: SWERR TR-72-42

UNCLASSIFIED REPORT

DESCRIPTORS: (*REFRACTORY METAL ALLOYS, *DIFFUSION
COATING), (*GUN BARRELS, *RIFLING), INERT GAS
WELDING, COMPOSITE MATERIALS, MANUFACTURING METHODS,
BONDING, TEST METHODS (U)
IDENTIFIERS: GAS PRESSURE BONDING, GUN BARREL
LINERS (U)

A PROGRAM WAS UNDERTAKEN BY THE RESEARCH
DIRECTORATE, WEAPONS LABORATORY AT ROCK
ISLAND, TO DETERMINE THE FEASIBILITY OF USING GAS
PRESSURE TECHNIQUES FOR PRODUCTION OF LINED,
PRERIFLED GUN BARRELS. PRESSURE CONTAINERS
CONSTRUCTED FROM SHORT-LENGTH TUBULAR STEEL SECTIONS
MACHINED TO GUN BARREL BORE DIMENSIONS WERE USED IN
THIS EXPERIMENT. FROM THE RESULTS OF THE TESTS
PERFORMED WITH LOW-YIELD STRENGTH MATERIALS (COPPER
AND MONEL), A SUITABLE PROFILE REPLICATION WAS
NOT ATTAINED ON THE RIFLE SURFACE. ON THE BASIS OF
TEST DATA OBTAINED, FORMING A RIFLING PROFILE AND
BONDING WITH A TANTALUM ALLOY ON AISI 4130 STEEL
WERE FOUND TO BE IMPRACTICAL WITH GAS PRESSURE
BONDING TECHNIQUES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-758 885 11/3 13/8 11/6
DEFENCE RESEARCH INFORMATION CENTRE ORPINGTON
(ENGLAND)

THE INFLUENCE OF ENVIRONMENT AND SURFACE
CONDITION ON THE PROPERTIES OF MATERIALS.
THE STRENGTH OF MEDIUM CARBON STEEL,
CHROMED BY VARIOUS METHODS, (U)

APR 73 9P KARPENKO, B. IGORBUNOV, N.
S. ;
REPT. NO. DRIC-TRANS-2156, DRIC-BR-30436

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF FIZIKO-KHIMICHESKAYA
MEKHANIKA MATERIALOV (USSR) V4 N2 P119-123 1968, BY
P. N. HILES.

DESCRIPTORS: (*STEEL, *CHROMIZING), DIFFUSION
COATING, PROTECTIVE TREATMENTS,
FATIGUE(MECHANICS), IMPREGNATION, CORROSION
RESISTANCE, FATIGUE(MECHANICS), MANUFACTURING
METHODS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

EQUIPMENT IS DESCRIBED FOR CHROMING STEEL BY
GASEOUS AND VAPOUR-PHASE METHODS. THE STRUCTURE OF
DIFFUSION LAYERS FORMED BY A VARIETY OF CHROMING
METHODS ARE STUDIED. AT EQUAL THICKNESS OF
DIFFUSION LAYERS THE GREATEST FATIGUE STRENGTH IS
OBSERVED IN STEELS CHROMED BY VAPOUR-PHASE AND
GASEOUS CONTACT METHODS. CORROSION FATIGUE
STRENGTH DEPENDS ON THE THICKNESS AND DENSITY OF THE
DIFFUSION LAYER IT HAS ITS GREATEST VALUE IN STEELS
AFTER GAS CONTACT CHROMING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-760 365

11/3

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF METALLURGY AND
MATERIALS SCIENCE

KINETICS OF PHASE LAYER GROWTH DURING
ALUMINIDE COATING OF NICKEL.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

APR 73

31P

HICKL, ANTHONY J. HECKEL,

RICHARD W. I

REPT. NO. TR-1

CONTRACT: N00014-67-A-0314-0017

PROJ: NR-031-714

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM COATINGS, *NICKEL ALLOYS),
DIFFUSION COATING, PHASE STUDIES, MATHEMATICAL
MODELS

(U)

THE DIFFUSION COATING OF NICKEL WITH ALUMINUM WAS STUDIED BY A TWO-STEP PROCESS INVOLVING INITIALLY AN INFLUX OF ALUMINUM AT THE SURFACE (ALUMINIZATION) AND LATER A PARTIAL HOMOGENIZATION OF THE ALUMINUM-RICH REGION UNDER CONDITIONS OF ZERO SURFACE FLUX. THE TWO-STEP PROCESS WAS STUDIED IN THE TEMPERATURE RANGE FROM 870 TO 1000C. THE ALUMINIZATION STEP WAS CHARACTERIZED MAINLY AS THE RAPID, PARABOLIC GROWTH OF THE γ 2AL3 PHASE (GAMMA) AT THE SURFACE. THE HOMOGENIZATION STEP WAS CHARACTERIZED MAINLY AS THE RELATIVELY SLOW THICKENING OF THE δ PHASE (DELTA), PRIMARILY BY THE SOLUTION OF THE GAMMA PHASE. A MATHEMATICAL MODEL WAS DEVELOPED, USING NUMERICAL METHODS AND COMPUTER TECHNIQUES, WHICH YIELDED GROWTH RATE PREDICTIONS FOR THE VARIOUS PHASE LAYERS IN AGREEMENT WITH EXPERIMENTAL DATA. THE MODEL WAS USED TO DEFINE THE CRITICAL PARAMETERS CONTROLLING GROWTH KINETICS FOR THE TWO-STEP PROCESS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-808 522 11/6 13/8
DU PONT DE NEMOURS (E I) AND CO INC WILMINGTON DEL
PIGMENTS DEPT

DEVELOPMENT OF COATINGS FOR PROTECTION OF DISPERSION
STRENGTHENED NICKEL FROM OXIDATION, PART II.
DEVELOPMENT OF CR-AL COATINGS BY VACUUM PACK
TECHNIQUES. (U)

DESCRIPTIVE NOTE: FINAL SUMMARY REPT. 1 FEB-31 DEC 65,
MAR 66 112P GADD, J. D. I
CONTRACT: AF 33(615)-1704
PROJ: AF-7312
TASK: 731201
MONITOR: AFML TR-66-47-PT-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART 3, AD-808 523.
PREPARED IN COOPERATION WITH TRW, INC., CLEVELAND,
OHIO. MATERIALS AND PROCESSES DEPT.

DESCRIPTORS: (*NICKEL ALLOYS, *DISPERSION
HARDENING), (*ALUMINUM COATINGS, NICKEL ALLOYS),
(*CHROMIUM, *DIFFUSION COATING), MICROSTRUCTURE,
OXIDATION, PROTECTION, EFFECTIVENESS, THERMAL
SHOCK, TENSILE PROPERTIES, STRESSES, RUPTURE,
COATINGS, CORROSION INHIBITION, CHROMIZING,
ACTIVE, OXIDES, CHROMIUM COMPOUNDS, CHLORIDES,
FLUORIDES, IODIDES, AMMONIUM COMPOUNDS, SODIUM
COMPOUNDS, ALUMINA, SPRAYS, SLURRY COATING,
VACUUM (U)

IDENTIFIERS: NICKEL TD(NI-2TH02), PACK
CEMENTATION PROCESS, CHROMIUM(III) CHLORIDE,
AMMONIUM CHLORIDE, AMMONIUM IODIDE, SODIUM
FLUORIDE, ALUMINUM OXIDE (U)

A PROGRAM WAS CONDUCTED TO DEVELOP VACUUM PACK
PROCESSING PARAMETERS FOR REPRODUCIBLY FORMING THE
DUPLEX CR-AL COATING SYSTEM ON TD NICKEL.
TARGET PROTECTIVE CAPABILITIES OF 500 HOURS CYCLIC
OXIDATION PROTECTION AT 2200 F AND 100 HOURS
PROTECTION AT 2400 F WERE ACHIEVED AND DEMONSTRATED
WITH THE VACUUM PACK CR-AL COATING. DATA ARE
PRESENTED DETAILING THE PARAMETERS REQUIRED TO FORM
THE CR-AL COATING ON TD NICKEL BY THE VACUUM
PACK PROCESS. PARAMETRIC STUDIES WERE CONDUCTED IN
BOTH LABORATORY SIZE (3 IN DIAMETER X 8 IN
RETORT) AND PILOT SCALE (8 IN DIAMETER X 20 IN
RETORT) COATING FURNACES. A SPRAY-DIFFUSION
TECHNIQUE WAS ALSO DEVELOPED FOR FORMATION OF THE
DUPLEX CR-AL COATING ON TD NICKEL. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-836 775 13/8 20/11
IIT RESEARCH INST CHICAGO ILL

EVALUATION OF NONDESTRUCTIVE TESTING TECHNIQUES OF
DIFFUSION COATINGS. (U)

DESCRIPTIVE NOTE: FINAL REPT. APR 66-JUL 67,
MAY 68 92P KARPLUS, H. B. ISEMMLER, R.

A. JARNESEN, B. E. J
REPT. NO. IITRI-M6127
CONTRACT: AF 33(615)-5294
PROJ: AF-7351
TASK: 735109
MONITOR: AFML TR-67-358

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIFFUSION COATING, NON-DESTRUCTIVE
TESTING), VISUAL INSPECTION, NUCLEAR INDUSTRIAL
APPLICATIONS, FLUORESCENCE, BACKSCATTERING, X
RAYS, ULTRASONIC PROPERTIES, SEEBECK EFFECT, BETA-
RAY SPECTRUM (U)
IDENTIFIERS: X-RAY FLUORESCENCE, EDDY
CURRENTS (U)

THREE NOVEL NONDESTRUCTIVE TESTING METHODS OF
DIFFUSION COATINGS WERE COMPARED WITH OTHER METHODS
AND CHECKED AGAINST MICROSCOPIC EXAMINATION BY
SUBSEQUENT SECTIONING OF SUSPECTED DEFECTS.
METHODS USED CONSISTED OF A BETA BACKSCATTER, X-
RAY FLUORESCENCE AND A MAGNETIC EDDY CURRENT
TECHNIQUE. THE EDDY CURRENT TECHNIQUE SHOWED THAT
VARIATIONS IN COATING THICKNESS AND LOCAL DEFECTS CAN
BE READILY OBSERVED. THIS METHOD CAN BE USED TO
SCAN LARGE AREAS. SCANNING SPEED WAS LIMITED BY
THE MECHANICAL SYSTEM USED FOR SCANNING PURPOSES.
THE BETA BACKSCATTER METHOD YIELDED LOW SENSITIVITY
AND A RATHER LOW SCANNING SPEED OF ABOUT 0.5 SQUARE
CENTIMETER PER MINUTE. X-RAY FLUORESCENCE WAS
CARRIED OUT ONLY AT A FEW SPOTS. SCANNING RATES OF
THE ORDER OF 1 SQUARE CENTIMETER PER HOUR WERE
OBTAINED. IMPROVED GEOMETRY CAN INCREASE THIS BY
AN ORDER OF MAGNITUDE BUT EVEN SUCH IMPROVEMENT IS
NOT LIKELY TO BE COMPETITIVE. (AUTHOR) (U)

UNCLASSIFIED

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AD-842 889

11/76

13/8

BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS. OXIDATION-
RESISTANT COATINGS FOR REFRACTORY METALS.

(U)

NOV 60

3P

ALLEN, B. C. I

UNCLASSIFIED REPORT

DESCRIPTORS: (*REFRACTORY METAL ALLOYS; DIFFUSION
COATING); HIGH-TEMPERATURE RESEARCH; LIFE
EXPECTANCY; INTERMETALLIC COMPOUNDS; NIOBIUM ALLOYS;
SLURRY COATING; TURBINE BLADES; HEAT TREATMENT;
IRIDIUM ALLOYS; CHROMIUM ALLOYS; IRON ALLOYS;
SILICON ALLOYS; VANADIUM ALLOYS; NICKEL ALLOYS;
NON-DESTRUCTIVE TESTING

(U)

IDENTIFIERS: ANNOUNCEMENT BULLETINS; EVALUATION;
NIOBIUM ALLOY B-66; NIOBIUM ALLOY C-129Y;
NIOBIUM ALLOY C6-72; NIOBIUM ALLOY XB-48

(U)

A MANUFACTURING METHOD FOR PRODUCING CHROMIUM-
TITANIUM-SILICON COATINGS ON LARGE COLUMBIUM-ALLOY
PARTS HAS BEEN DEVELOPED. THE PROGRAM WAS
ACCOMPLISHED IN THREE PRINCIPAL AREAS AS FOLLOWS:
(1) SCALE-UP OF THE DIFFUSION PACK PROCESS,
(2) SCALE-UP OF THE SLURRY DIFFUSION PROCESS, AND
(3) PRODUCTION PROOF OF THE SLURRY-DIFFUSION
PROCESS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-848 767 13/9 11/3 11/8
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INCREASING THE WEAR RESISTANCE OF MACHINE
PARTS BY DIFFUSIVE SULFIDIZATION AND
MOLYBDENUM DISULFIDE.

(U)

AUG 68 31P NAINAR, J. HASIL, F. I
REPT. NO. FTD-HT-23-242-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF STROJIRENSTVI
(CZECHOSLOVAKIA) V17 N6 P426-436 1967, BY H.
PECK.

DESCRIPTORS: (*MACHINES, *WEAR RESISTANCE),
(*LUBRICANTS, DIFFUSION COATING), SOLIDS,
MOLYBDENUM COMPOUNDS, SULFIDES, MICROSTRUCTURE,
FRICTION, HARDNESS, CZECHOSLOVAKIA

(U)

IDENTIFIERS: TRANSLATIONS, MOLYBDENUM DISULFIDE,
SOLID LUBRICANTS

(U)

THE AUTHORS REVIEW THE RESULTS OF CZECH RESEARCH
ON METHODS OF ANTIFRICTION SURFACE-TREATMENT OF IRON-
BASE MATERIALS AND THE EXPERIENCE OF THE INDUSTRY
WITH THESE METHODS. TWO METHODS ARE DISCUSSED:
SULFIDIZING AND THE USE OF SOLID MOLYBDENUM-
DISULFIDE-BASE LUBRICANTS. ORIGINALLY SULFIDIZING
WAS DONE IN A FUZED-SALT BATH, BUT LATELY NUMEROUS
PLANTS HAVE INTRODUCED SULFIDIZING IN A GASEOUS
ATMOSPHERE (SULFONITRIDING). THE PRESENT
CAPACITY OF SULFIDIZING EQUIPMENT IS ABOUT 3000 TONS
PER YEAR WITH TWO DAILY SHIFTS. A WIDER USE OF
SOL'D MOLYBDENUM-DISULFIDE BASE LUBRICANTS DATES BACK
TO 1960 WHEN SOME CZECH CHEMICAL PLANTS BEGAN TO
PRODUCE MOLYBDENUM DISULFIDE. LATELY MOLYBDENUM
DISULFIDE HAS BEEN USED AS SUCH AND IN COMBINATIONS
WITH CONVENTIONAL LUBRICANTS IN NUMEROUS
APPLICATIONS, INCLUDING THE LUBRICATION OF MOVING
MACHINE PARTS AND METAL-FORMING OPERATIONS.

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-883 046 11/3 11/6 21/5
TRW EQUIPMENT GROUP CLEVELAND OHIO

DEVELOPMENT OF IMPROVED COATINGS FOR NICKEL-
AND COBALT-BASE ALLOYS.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL SUMMARY REPT. 1 JUN
68-31 JUL 70,

DEC 70 311P NEJEDLIK, JAMES F. ;
REPT. NO. ER-7305-F
CONTRACT: F33615-68-C-1628
PROJ: AF-7312
TASK: 731201
MONITOR: AFML TR-70-208

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, *CORROSION INHIBITION);
(*NICKEL ALLOYS, COATINGS), (*COBALT ALLOYS,
COATINGS), (*GAS TURBINE BLADES, PROTECTIVE
TREATMENTS), DIFFUSION COATING, HEAT-RESISTANT
METALS + ALLOYS, ALUMINUM ALLOYS, IRON ALLOYS,
CHROMIUM ALLOYS, MECHANICAL PROPERTIES
IDENTIFIERS: SUPERALLOYS, *PROTECTIVE
COATINGS.

(U)

(U)

THE PURPOSE OF THIS STUDY WAS TO DEVELOP AND
UPGRADE ALUMINUM CONTAINING COATING SYSTEMS FOR THE
PROTECTION OF NICKEL AND COBALT ALLOYS USED IN GAS
TURBINE HOT SECTION COMPONENTS. A COMPREHENSIVE
INVESTIGATION OF MODIFYING ELEMENTS WAS UNDERTAKEN
AND CORRELATED WITH HOT CORROSION RESISTANCE AND
DIFFUSIONAL STABILITY UNDER BLADE AND VANE CYCLE
CONDITIONS (1950 AND 2200F PEAK TEMPERATURES,
RESPECTIVELY). THE MODIFYING ELEMENTS AND
COMBINATIONS EVALUATED WERE CO, MN, CR, TA,
FE, MG, SI, Y, CR-MN, CO-CR AND FE-
CR. THE INFLUENCE OF THE MODIFIED COATINGS ON
MECHANICAL PROPERTIES, STRESS-OXIDATION, IMPACT AND
THERMAL SHOCK OF THE SUPERALLOYS WAS ALSO DETERMINED.
(AUTHOR)

(U)

UNCLASSIFIED

CORPORATE AUTHOR - MONITORING AGENCY

•AIR FORCE AVIONICS LAB WRIGHT-
PATTERSON AFB OHIO

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ALUMINIUM ALLOYS.

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WILMINGTON DEL WILMINGTON DEL

DEVELOPMENT OF COATINGS FOR
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